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Isaac Hays M.D.

MEDICAL INQUIRIES

AND

OBSERVATIONS.

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PROFESSOR OF THE INSTITUTES AND PRACTICE OF MEDICINE AND OF CLINICAL
PRACTICE, IN THE UNIVERSITY OF PENNSYLVANIA.

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“ Medical Inquiries and Observations. By Benjamin Rush, M. D. Professor of
“ the Institutes and Practice of Medicine and of Clinical Practice, in the Univer-
“ sity of Pennsylvania. In four volumes. The third edition, revised and enlarged
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D. CALDWELL,
Clerk of the District of Pennsylvania.

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PREFACE.

THE author of the following edition of Medical Inquiries, and Observations, has changed the order in which several of the subjects were arranged in the former editions. He has given the Lectures upon Animal Life the first place in the first volume, and has arranged the histories of Epidemics in succession to each other. Some facts have been added to several of the Inquiries, particularly to the Lectures upon Animal Life, to the History of the Phænomena of Fever, to the Observations upon the Gout, and to the Defence of Blood-letting; but no alteration has been made in any of the Medical principles of the author. He has preferred the term of “phænomena” to that of “theory” of fever, because he conceives the doctrine he has aimed to establish upon that subject, rests upon facts only, obvious not only to reason, but in most instances, to the senses.

He has omitted the Lecture upon Inoculation for the Small-pox, from a belief that the universal practice of Vaccination has rendered it in a great measure an unnecessary part of the education and knowledge of a physician.

The Observations upon the Cure of Obstinate Intermittent Fevers by means of Blood letting, contained in the former editions, have been incorporated with the defence of that remedy.

The author has added to this edition an Account of the Cure of Several Diseases, by the Extraction of Decayed Teeth, published originally in the New York Medical Repository.

BENJAMIN RUSH.

October, 31, 1809.

MEDICAL INQUIRIES

AND

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
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AN INQUIRY
INTO THE
CAUSE OF ANIMAL LIFE.

IN THREE LECTURES.

DELIVERED IN THE UNIVERSITY OF PENNSYLVANIA.



AN INQUIRY, &c.

LECTURE I.

GENTLEMEN,

MY business in this chair is to teach the institutes of medicine. They have been divided into physiology, pathology, and therapeutics. The objects of the first are, the laws of the human body in its healthy state. The second includes the history of the causes and seats of diseases. The subjects of the third are the remedies for those diseases. In entering upon the first part of our course, I am met by a remark delivered by Dr. Hunter in his introductory lectures to his course of anatomy. "In our branch (says the doctor) those teachers who study to captivate young minds with ingenious speculations, will not leave a reputation behind them that will outlive them half a century. When they cease from their labours, their labours will be buried along with them. There never was a man more followed and admired in physiology, than Dr. Boerhaave. I remember the veneration in which he was held. And now, in the space of forty years, his physiology is—it shocks me to think in what a light it appears."* Painful as this premonition may be to the teachers of physiology, it should not deter them from speculating upon physiological subjects. Simple anatomy is a mass of dead matter. It is physiology which infuses life into it. A knowledge of the structure of the human body occupies only the memory. Physiology introduces it to the higher and more noble faculties of the mind. The component parts of the body may be compared to the materials of a house, lying without order in a yard. It is

physiology, like a skilful architect, which connects them together, so as to form from them an elegant and useful building. The writers against physiology resemble, in one particular, the writers against luxury. They forget that the functions they know and describe belong to the science of physiology; just as the declaimers against luxury forget that all the conveniences which they enjoy beyond what are possessed in the most simple stage of society, belong to the luxuries of life. The anatomist who describes the circulation of the blood, acts the part of a physiologist, as much as he does, who attempts to explain the functions of the brain. In this respect Dr. Hunter did honour to our science; for few men ever explained that subject, and many others equally physiological, with more perspicuity and eloquence, than that illustrious anatomist. Upon all new and difficult subjects there must be pioneers. It has been my lot to be called to this office of hazard and drudgery; and if in discharging its duties I should meet the fate of my predecessors, in this branch of medicine, I shall not perish in vain. My errors, like the bodies of those who fall in forcing a breach, will serve to compose a bridge for those who shall come after me, in our present difficult enterprise. This consideration, aided by just views of the nature and extent of moral obligation, will overbalance the evils anticipated by Dr. Hunter, from the loss of posthumous fame. Had a prophetic voice whispered in the ear of Dr. Boerhaave in the evening of his life, that in the short period of forty years, the memory of his physiological works would perish from the earth, I am satisfied, from the knowledge we have of his elevated genius and piety he would have treated the prediction with the same indifference that he would have done, had he been told, that in the same time, his name should be erased from a pane of glass, in a noisy and vulgar country tavern.

The subjects of the lectures I am about to deliver, you will find in a syllabus which I have prepared and published, for the purpose of giving you a succinct view of the extent and connection of our course. Some of these subjects will be new in lectures upon the institutes of medicine, particularly those which relate to morals, metaphysics, and theology. However thorny these questions may appear, we must approach and handle them; for they are intimately connect-

ed with the history of the faculties and operations of the human mind; and these form an essential part of the animal economy. Perhaps it is because physicians have hitherto been restrained from investigating, and deciding upon these subjects, by an erroneous belief that they belong exclusively to another profession, that physiology has so long been an obscure and conjectural science.

In beholding the human body, the first thing that strikes us, is its *life*. This, of course, should be the first object of our inquiries. It is a most important subject; for the end of all the studies of a physician is to preserve life; and this cannot be perfectly done, until we know in what it consists.

I include in animal life, as applied to the human body, *motion, heat, sensation, and thought*. These four when united, compose perfect life. It may exist without thought, sensation, or heat, but none of them can exist without motion. The lowest grade of life, probably exists in the absence of even motion, as I shall mention hereafter. I have preferred the term *motion* to those of oscillation and vibration, which have been employed by Dr. Hartley in explaining the laws of animal matter; because I conceived it to be more simple, and better adapted to common apprehension.

In treating upon this subject, I shall first consider animal life as it appears in the waking and sleeping states in a healthy adult, and shall afterwards inquire into the modification of its causes in the fœtal, infant, youthful, and middle states of life, in certain diseases, in different states of society, in different climates, and in different animals.

Before I proceed any further, I shall remark, that there are certain grades of matter; and that in all its forms it is necessarily passive or in other words, possesses no self-moving power. Every form of it is moved by a force external to it, and each form has its appropriate or specific stimulus, or stimuli, from the waves that are moved by the wind, and the sand upon the sea shore which is moved by the waves, up to the human body which is moved by the stimuli to be mentioned presently. From this view of matter, I am naturally led to reject the common division of it into active and passive, or into substances that possess a power to move themselves, and into such as require a power to move them. I believe that animals, like water, earth

and air, nay further, that the mind of man—are all moved only by their appropriate stimuli; and that water, earth and air do not become more certainly quiescent from the abstraction of the causes that move them, than motion, heat, sensation and thought cease from the abstraction of impressions upon the human body. The only difference between what is called animated and inanimate matter consists in the stimuli which move the former, acting constantly, and in health, with uniformity; whereas the stimuli which act upon the latter, act occasionally and with intermissions. However diversified the motions and effects of these stimuli may be, the causes of their motions are exactly the same.

I shall begin by delivering a few general propositions.

I. Every part of the human body (the nails and hair excepted) is endowed with sensibility, or excitability, or with both of them. By sensibility is meant the power of having sensation excited by the action of impressions. Excitability denotes that property in the human body, by which motion is excited by means of impressions. This property has been called by several other names, such as irritability, contractility, mobility, and stimulability.

I shall make use of the term excitability, for the most part, in preference to any of them. I mean by it, a capacity of imperceptible, as well as obvious motion. It is of no consequence to our present inquiries, whether this excitability be a quality of animal matter, or a substance. The latter opinion has been maintained by Dr. Girtanner, and has some probability in its favour.

II. The whole human body is so formed and connected, that impressions made in the healthy state upon one part, excite motion, or sensation, or both, in every other part of the body. From this view, it appears to be a unit, or a simple and indivisible substance. Its capacity for receiving motion, and sensation, is variously modified by means of what are called the senses. It is external, and internal. The impressions which act upon it shall be enumerated in order.

III. Certain motions are voluntary, and others are performed in an involuntary manner.

IV. Different parts of the body possess different degrees of what has been called excitability, that is, different degrees of susceptibility to the action of the same stimuli upon them.

V. Life is the *effect* of certain stimuli acting upon the sensibility and excitability which are extended, in different degrees, over every external and internal part of the body. These stimuli are as necessary to its existence, as air is to flame. Animal life is truly (to use the words of Dr. Brown) "a forced state." I have said the *words* of Dr. Brown; for the opinion was delivered by Dr. Cullen in the university of Edinburgh, in the year 1766, and was detailed by me in this school, many years before the name of Dr. Brown was known as a teacher of medicine. It is true, Dr. Cullen afterwards deserted it; but it is equally true, I never did: and the belief of it has been the foundation of many of the principles and modes of practice in medicine which I have since adopted. In a lecture which I delivered in the year 1771, I find the following words, which are taken from a manuscript copy of lectures given by Dr. Cullen upon the institutes of medicine. "The human body is not an automaton, or self-moving machine; but is kept alive and in motion, by the constant action of stimuli upon it." In thus ascribing the discovery of the cause of life which I shall endeavour to establish, to Dr. Cullen, let it not be supposed I mean to detract from the genius and merit of Dr. Brown. To his intrepidity in reviving and propagating it, as well as for many other truths contained in his system of medicine, posterity, I have no doubt, will do him ample justice, after the errors that are blended with them have been corrected, by their unsuccessful application to the cure of diseases.

Agreeably to our last proposition, I proceed to remark, that the action of the brain, the diastole and systole of the heart, the pulsation of the arteries, the contraction of the muscles, the peristaltic motion of the bowels, the absorbing power of the lymphatics, secretion, excretion, hearing, seeing, smelling, taste, and the sense of touch, nay more, thought itself, are all the effects of stimuli acting upon the organs of sense and motion. These stimuli have been divided into external and internal. The external are light, sound, odours, air, heat, exercise, and the pleasures of the senses. The internal stimuli are food, drinks, chyle, the blood, a certain tension of the glands, which contained secreted liquors, and the exercises of the faculties of the mind; each of which I shall treat in the order in which they have been mentioned.

I. Of external stimuli. The *first* of these is Air. In support of this opinion, I shall produce the highest authority, and that is, the history of the creation of man, as recorded in the second chapter of the book of Genesis. For this purpose, I beg you would accompany me in your imaginations to the garden of Eden, the birth place of the great progenitor of the human race. In the midst of this garden, behold a human figure! Let us approach it: How exquisitely formed are its head, its body, and its limbs! All is symmetry and beauty! Let us approach still nearer, and examine it by the aid of all our senses. It is motionless as the earth upon which it stands. Its external surface is cold, but soft. Its well formed face is pale, and its eyes, mouth, and nostrils are all closed. But who is that august figure that with slow and majestic steps advances towards it? It is its Creator in a human shape. Let us retire a little to make room for him to come nearer to the beautiful workmanship of his divine hands. What follows? Let the inspired historian tell us. "And the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life, and man became a living soul."* The common explanation of this passage of Scripture is, that God, in this act, infused a soul into the torpid, or lifeless body of Adam, and that his soul became its principle of life, or in other words, that he thus changed a dead mass of animalized matter, into an animated being. That this was not the case I infer, not only from the existence of life in many persons in whom the soul is in a dormant or torpid state from diseases in the brain, but from a more liberal and correct translation of the above passage of Scripture, in which I am warranted by several Hebrew scholars in our city, alike eminent for their learning and piety. It is as follows. "And the Lord God breathed into his nostrils, the *air of lives*, and he became a living soul." That is, he dilated his nostrils, and thereby inflated his lungs with air, and thus excited in him, animal, intellectual and spiritual life, in consequence of which he became an animated human creature. From this view of the origin of life in Adam, it appears that his soul and body were cast in the same mould, and at the same time, and that both were animated by the same act of Divine power by means of the same stream of air. The

* Verse 7.

resuscitation of the body after appearing to be dead, by means of stimuli, more especially by the stimulus of air, favours the explanation I have given of the beginning of life in man. The air thus infused into his lungs, by expanding and stimulating them, communicated action, first to the heart, the heart moved the quiescent blood, the blood moved the quiescent brain, the brain moved the quiescent mind, the eyes and the mouth are now opened, the blood pervades the capillary vessels of the face, and discharges a part of the paleness from it; his skin becomes warm; his will, the great executive faculty of the mind, begins to act; other stimuli co-operate with the action of the air; behold! he moves, he walks, he is perfectly and universally animated. Thus gentlemen I believe began the life of man.

That the air, by exciting respiration, gave the first impulse of life to the body and mind of Adam, and that it is essential to it, I infer from many passages in the Old and New Testaments, besides the one I have mentioned. I shall enumerate a few of them.

1. The dry bones seen by Ezekiel in a vision, when brought together, were devoid of life, until the winds are invoked to inflate their lungs with air.* Immediately afterwards they became living and intelligent beings.

2. Job places the life of the whole human race in their breath. Hence he says, "In whose hand (meaning the Deity's) is the soul of every living creature, and the breath of all mankind."† Again he says, "The Spirit of the Lord hath made me, and the breath of the Almighty hath given me life.‡

3. St. Paul in his famous sermon preached at Athens, makes life and breath synonymous; hence he says, "He (meaning the Creator of the world) giveth to all, life and breath."§

The intimate and indissoluble connection between breath or air, and life, is established still further by the connection which the scriptures hold forth between the absence of breath, or air, and the presence of death.

4. The son of the widow of Zarephath is said to die, when "his sickness was so sore, that there was no breath left in him."||

* Chap. xxxvii.

§ Acts xvii. 25.

† Chap. xiii. 10.

|| 1 Kings xvii. 17.

‡ Chap. xxxiii. 4.

5. The author of the 164th Psalm says, "Thou hidest thy face, they are troubled ; thou takest away their breath ; they die, and return to their dust."* Again, the author of the 146th Psalm, in speaking of the death of man, says, "His breath goeth forth, he returneth to his earth ; in that very day his thoughts perish."†

Exactly in the same way in which I have supposed life began in the first man in the garden of Eden, does it begin in every child that comes into the world. The first portion of air that rushes into its lungs, sets them in motion. They move the heart—hence they have been called "*cordis flabellum*," or "*ventilabrum*," that is, the bellows of the heart—the heart moves the brain ; the brain gradually awakens and moves the mind ; and both brain and mind by their re-action, move every other part of the body. The first impression of air upon the lungs of a new born infant is painful, and hence its cries give the first notice of the passage of its head into the world. It is probable the action of air upon its body likewise excites pain, and that the red colour of its skin, may be the effect of it. This sensation of pain is soon destroyed by habit, and from the operation of a kind law in the animal economy, it is afterwards followed by a sense of pleasure. Respiration for a while in a new born infant is at first altogether involuntary. The heart moves in like manner from the effects of respiration upon it. After some time the will acquires, from the influence of habit, a partial voluntary power over the lungs, but the heart continues to move through every stage of life, only in consequence of the perpetual impressions which are made upon it. Its action is therefore very properly said to be altogether involuntary.

That an action originally involuntary may become voluntary, and that actions originally voluntary may become involuntary, from habit, is obvious from many facts. The former appears not only in respiration, but in the command which all men acquire over their arms and legs and over the sphincters of the rectum and bladder, and which some men acquire over their stomachs and diaphragms, so as to puke and hiccough at their pleasure, while the latter appears in many diseases, and, as I shall say hereafter, in the last

* Verse 29.

† Verse 4.

hours of life. Convulsions in a limb, or muscle, are a striking proof of this change of a voluntary into an involuntary action. The same things appear in the tremors in the limbs in old people, and in the fatal consequences which frequently attend their falling down in walking. The whole weight of their heads and bodies generally strikes the ground, and that from the loss of the power of their wills over their arms, which by being protruded, break the force of a fall in early and middle life.

I shall hereafter add a number of facts from the history of life in other animals, which will, I hope, support the important office I have ascribed to the air in imparting the first impulse to life in the human species.

2. Light appears to occupy the next grade to air, in the production of animal life. It is remarkable that the progenitor of the human race was not brought into existence until all the luminaries of heaven were created. Light acts chiefly through the medium of the organs of vision. Its influence upon animal life is feeble, compared with some other stimuli to be mentioned hereafter ; but it has its proportion of force. Sleep has been said to be a tendency to death ; now the absence of light we know invites to sleep, and the return of it excites the waking state. The late Mr. Rittenhouse informed me, that for many years he had constantly awoke with the first dawn of the morning light, both in summer and winter. Its influence upon the animal spirits strongly demonstrates its connection with animal life, and hence we find a cheerful and a depressed state of mind in many people, and more especially in invalids, to be intimately connected with the presence or absence of the rays of the sun. The well-known pedestrian traveller, Mr. Stewart, in one of his visits to this city, informed me, that he had spent a summer in Lapland, in the latitude of 69° , during the greatest part of which time the sun was seldom out of sight. He enjoyed, he said, during this period, uncommon health and spirits, both of which he ascribed to the long duration, and invigorating influence of light. These facts will surprise us less when we attend to the effects of light upon vegetables. Some of them lose their colour by being deprived of it ; many of them discover a partiality to it in the direction of their flowers ; and all of

them discharge their pure air only while they are exposed to it.*

3. Sound has an extensive influence upon human life. Its numerous artificial and natural sources need not be mentioned. I shall only take notice, that the currents of winds, the passage of insects through the air, and even the growth of vegetables, are all attended with an emission of sound; and although they become imperceptible from habit, yet there is reason to believe they all act upon the body, through the medium of the ears. The existence of these sounds is established by the reports of persons who have ascended two or three miles from the earth in a balloon. They tell us that the silence which prevails in those regions of the air is so new and complete, as to produce an awful solemnity in their minds. It is not necessary that these sounds should excite sensation or perception, in order to their exerting a degree of stimulus upon the body. There are a hundred impressions daily made upon it, which from habit are not followed by sensation. The stimulus of aliment upon the stomach, and of blood upon the heart and arteries, probably cease to be felt, only from the influence of habit. The exercise of walking, which was originally the result of a deliberate act of the will, is performed from habit without the least degree of consciousness. It is unfortunate for this, and many other parts of physiology, that we forget what passed in our minds the first two or three years of our lives. Could we recollect the manner in which we acquired our first ideas, and the progress of our knowledge with the evolution of our senses and faculties, it would relieve us from many difficulties and controversies upon this subject. Perhaps this forgetfulness by children, of the origin and progress of their knowledge, might be remedied by our attending more closely to the first effects of impressions, sensation, and perception upon them, as discovered by their little actions; all of which probably have a meaning, as determined as any of the actions of men or women.

* Organization, sensation, spontaneous motion, and life, exist only at the surface of the earth, and in places exposed to *light*. We might affirm the flame of Prometheus's torch was the expression of a philosophical truth that did not escape the ancients. Without light, nature was lifeless, inanimate, and dead. A benevolent God, by producing life, has spread organization, sensation, and thought over the surface of the earth."--*Lavoisier*.

The influence of sounds of a certain kind in producing excitement, and thereby increasing life, cannot be denied. Fear produces debility, which is a tendency to death. Sound obviates this debility, and thus restores the system to the natural and healthy grade of life. The school-boy and the clown invigorate their feeble and trembling limbs by whistling or singing as they pass by a country churchyard, and the soldier feels his departing life recalled in the onset of a battle by the noise of the fife, and of the poet's "spirit stirring drum." Intoxication is frequently attended with a higher degree of life than is natural. Now sound we know will produce this with a very moderate portion of fermented liquor; hence we find men are more easily and highly excited by it at public entertainments where there is music, loud talking, and hallooing, than in private companies where there is no auxiliary stimulus added to that of the wine. I wish these effects of sound upon animal life to be remembered; for I shall mention it hereafter as a remedy for the weak state of life in many diseases, and shall relate an instance in which a scream suddenly extorted by grief, proved the means of resuscitating a person who was supposed to be dead, and who had exhibited the usual recent marks of the extinction of life.

I shall conclude this head by remarking, that persons who are destitute of hearing and seeing possess life in a more languid state than other people; and hence arise the dulness and want of spirits which they discover in their intercourse with the world.

4. Odours have a sensible effect in promoting animal life. The greater healthiness of the country, than cities, is derived in part from the effluvia of odoriferous plants, which float in the atmosphere in the spring and summer months, acting upon the system, through the medium of the sense of smelling. The effects of odours upon animal life appear still more obvious in the sudden revival of it, which they produce in cases of fainting. Here the smell of a few drops of hartshorn, or even of a burnt feather, has frequently in a few minutes restored the system, from a state of weakness bordering upon death, to an equable and regular degree of excitement.

5. Heat is a uniform and active stimulus in promoting life. It is derived, in certain seasons and countries, in part

from the sun ; but its principal source is from that cause whatever it may be, which produces animal heat. The extensive influence of heat upon animal life, is evident from its decay and suspension during the winter in certain animals, and from its revival upon the approach and action of the vernal sun. It is true, life is diminished much less in man, from the distance and absence of the sun, than in other animals ; but this must be ascribed to his possessing reason in so high a degree, as to enable him to supply the abstraction of heat, by the action of other stimuli upon his system.

6. Exercise acts as a stimulus upon the body in various ways. Its first impression is upon the muscles. These act upon the blood-vessels, and they upon the nerves and brain. The necessity of exercise to animal life is indicated, by its being kindly imposed upon man in paradise. The change which the human body underwent by the fall, rendered the same salutary stimulus necessary to its life, in the more active form of labour. But we are not to suppose, that motion is excited in the body by exercise or labour alone. It is constantly stimulated by the positions of standing, sitting, and lying upon the sides ; all of which act more or less upon muscular fibres, and by their means, upon every part of the system.

7. The pleasures we derive from our senses have a powerful and extensive influence upon human life. The number of these pleasures, and their proximate cause, will form an agreeable subject for two or three future lectures.

We proceed next to consider the internal stimuli which produce animal life. These are.

I. **FOOD.** This acts in the following ways. 1. Upon the tongue. Such are the sensibility and excitability of this organ, and so intimate is its connection with every other part of the body, that the whole system is invigorated by aliment, as soon as it comes in contact with it. 2. By mastication. This moves a number of muscles and blood-vessels situated near the brain and heart, and of course imparts impressions to them. 3. By deglutition, which acts upon similar parts, and with the same effect. 4. By its presence in the stomach, in which it acts by its quantity and quality. Food, by distending the stomach, stimulates the contiguous parts of the body. A moderate degree of disten-

tion of the stomach and bowels is essential to a healthy excitement of the system. Vegetable aliment and drinks, which contain less nourishment than animal food, serve this purpose in the human body. Hay acts in the same manner in a horse. Sixteen pounds of this light food in a day are necessary to keep up such a degree of distention in the stomach and bowels of this animal, as to impart to him his natural grade of strength and life. The *quality* of food, when of a stimulating nature, supplies the place of its distention from its quantity. A single onion will support a lounging highlander on the hills of Scotland for four and twenty hours. A moderate quantity of salted meat, or a few ounces of sugar, have supplied the place of pounds of less stimulating food. Even indigestible substances, which remain for days, or perhaps weeks in the stomach, exert a stimulus there which has an influence upon animal life. It is in this way the tops of briars, and the twigs of trees, devoid not only of nourishing matter, but of juices, support the camel in his journies through the deserts of the eastern countries. Chips of cedar posts moistened with water have supported horses for two or three weeks, during a long voyage from Boston to Surinam; and the indigestible cover of an old Bible preserved the life of a dog, accidentally confined in a room at Newcastle upon Tyne, for twenty days. 5. Food stimulates the whole body by means of the process of digestion which goes forward in the stomach. This animal function is carried on by a process, in which there is probably an extrication of heat and air. Now both these, it has been remarked, exert a stimulus in promoting animal life.

Drinks, when they consist of fermented or distilled liquors, stimulate from their quality; but when they consist of water, either in its simple state, or impregnated with any sapid substance, they act principally by distention.

II. The chyle acts upon the lacteals, mesenteric glands, and thoracic duct, in its passage through them; and it is highly probable, its first mixture with the blood in the subclavian vein, and its first action on the heart, are attended with considerable stimulating effects.

III. The blood is a very important internal stimulus. It has been disputed whether it acts by its quality, or only by distending the blood-vessels. It appears to act in both

ways. I believe with Dr. Whytt. that the blood stimulates the heart and arteries by a specific action. But if this be not admitted, its influence in distending the blood-vessels in every part of the body, and thereby imparting extensive and uniform impressions to every animal fibre, cannot be denied. In support of this assertion it has been remarked, that in those persons who die of hunger, there is no diminution of the quantity of blood in the large blood-vessels.

IV. A certain *tension* of the glands, and of other parts of the body, contributes to support animal life. This is evident in the vigour which is imparted to the system, by the fulness of the seminal vesicles and gall bladder, and by the distention of the uterus in pregnancy. This distention is so great, in some instances, as to prevent sleep for many days and even weeks before delivery. It serves the valuable purpose of rendering the female system less liable to death during its continuance, than at any other time. By increasing the quantity of life in the body, it often suspends the fatal issue of pulmonary consumption, and ensures a temporary victory over the plague and other malignant fevers; for death, from those diseases, seldom takes place, until the stimulus, from the distention of the uterus, is removed by parturition.

V. The exercises of the faculties of the mind have a wonderful influence in increasing the quantity of human life. They all act by *reflection* only, after having been previously excited into action by impressions made upon the body. This view of the *re-action* of the mind upon the body accords with the simplicity of other operations in the animal economy. It is thus the brain repays the heart for the blood it conveys to it, by re-acting upon its muscular fibres. The influence of the different faculties of the mind is felt in the pulse, in the stomach, and in the liver, and is seen in the face, and other external parts of the body. Those which act most unequivocally in promoting life are the understanding, the imagination, and the passions. Thinking belongs to the understanding, and is attended with an obvious influence upon the degree and duration of life. Intense study has often rendered the body insensible to the debilitating effects of cold and hunger. Men of great and active understandings, who blend with their studies, temperance and exercise, are generally long

lived. In support of this assertion, a hundred names might be added to those of Newton and Franklin. Its truth will be more fully established by attending to the state of human life in persons of an opposite intellectual character. The Cretins, a race of idiots in Valais, in Switzerland, travellers tell us, are all short lived. Common language justifies the opinion of the stimulus of the understanding upon the brain: hence it is common to say of dull men, that they have scarcely ideas enough to keep themselves awake.

The imagination acts with great force upon the body, whether its numerous associations produce pleasure or pain. But the passions pour a constant stream upon the wheels of life. They have been subdivided into emotions and passions properly so called. The former have for their objects present, the latter, future good and evil. All the objects of the passions are accompanied with desire or aversion. To the former belong chiefly, hope, love, ambition, and avarice; to the latter, fear, hatred, malice, envy, and the like. Joy, anger, and terror, belong to the class of emotions. The passions and emotions have been further divided into stimulating and sedative. Our business at present is to consider their first effect only upon the body. In the original constitution of human nature, we were made to be stimulated by such passions and emotions only as have moral good for their objects. Man was designed to be always under the influence of hope, love, and joy. By the loss of his innocence, he has subjected himself to the dominion of passions and emotions of a malignant nature; but they possess, in common with such as are good, a stimulus which renders them subservient to the purpose of promoting animal life. It is true, they are like the stimulus of a dislocated bone in their operation upon the body, compared with the action of antagonist muscles stretched over bones, which gently move in their natural sockets. The effects of the good passions and emotions, in promoting health and longevity, have been taken notice of by many writers. They produce a flame, gentle and pleasant, like oil perfumed with frankincense, in the lamp of life. There are instances likewise of persons who have derived strength and long life from the influence of the evil passions and emotions that have been mentioned. Dr. Darwin relates the history of a man, who used to over-

come the fatigue induced by travelling, by thinking of a person whom he hated. The debility induced by disease is often removed by a sudden change in the temper. This is so common, that even nurses predict a recovery in persons as soon as they become peevish and ill-natured, after having been patient during the worst stage of their sickness. This peevishness acts as a gentle stimulus upon the system in its languid state, and thus turns the scale in favour of life and health. The famous Benjamin Lay, of this state, who lived to be eighty years of age, was of a very irascible temper. Old Elwes was a prodigy of avarice, and every court in Europe furnishes instances of men who have attained to extreme old age, who have lived constantly under the dominion of ambition. In the course of a long inquiry which I instituted some years ago into the state of the body and mind in old people, I did not find a single person above eighty, who had not possessed an active understanding, or active passions. Those different and opposite faculties of the mind, when in excess, happily supply the place of each other. Where they unite their forces, they extinguish the flame of life, before the oil which feeds it is consumed.

In another place I shall resume the history of the influence of the faculties of the mind upon human life, as they discover themselves in the different pursuits of men.

I have only to add here, that I see no occasion to admit, with the followers of Dr. Brown, that the mind is active in sleep, in preserving the motions of life. I hope to establish hereafter the opinion of Mr. Locke, that the mind is always passive in sound sleep. It is true it acts in dreams; but these depend upon a morbid state of the brain, and therefore do not belong to the present stage of our subject, for I am now considering animal life only in the healthy state of the body. I shall say presently, that dreams are intended to supply the absence of some natural stimulus, and hence we find they occur in those persons most commonly, in whom there is a want of healthy action in the system, induced by the excess or deficiency of customary stimuli.

Life is in a languid state in the morning. It acquires vigour by the gradual and successive application of stimuli in the forenoon. It is in its most perfect state about mid-day, and remains stationary for some hours. From the

diminution of the sensibility and contractility of the system to the action of impressions, it lessens in the evening, and becomes again languid at bed-time. These facts will admit of an extensive application hereafter in our lectures upon the practice of physic.

LECTURE II.

GENTLEMEN,

THE stimuli which have been enumerated, when they are collectively, and within certain bounds, produce a healthy waking state. But they do not always act collectively, nor in the determined and regular manner that has been described. There is in many states of the system, a deficiency of some stimuli, and, in some of its states, an apparent absence of them all. To account for the continuance of animal life under such circumstances, two things must be premised, before we proceed to take notice of the diminution or absence of the stimuli which support it.

1. The healthy actions of the body in the waking state consist in a proper degree of what has been called excitability and excitement. The former is the medium on which stimuli act in producing the latter. In an exact proportion, and a due relation of both, diffused uniformly throughout every part of the body, consists good health. Disease is the reverse of this. It depends *in part* upon a disproportion between excitement and excitability, and in a partial distribution of each of them. In thus distinguishing the different states of excitement and excitability in health and sickness, you see I dissent from Dr. Brown, who supposes them to be (though disproportioned to each other) equably diffused in the morbid, as well as the healthy state of the body.

2. It is a law of the system, that the absence of one natural stimulus is generally supplied by the increased ac-

tion of others. This is more certainly the case where a natural stimulus is abstracted *suddenly*; for the excitability is thereby so instantly formed and accumulated, as to furnish a highly sensible and moveable surface for the remaining stimuli to act upon. Many proofs might be adduced in support of this proposition. The reduction of the excitement of the blood-vessels, by means of cold, prepares the way for a full meal, or a warm bed, to excite in them the morbid actions which take place in a pleurisy or rheumatism. A horse in a cold stable eats more than when in a warm one, and thus counteracts the debility which would otherwise be induced upon his system, by the abstraction of the stimulus of warm air.

These two propositions being admitted, I proceed next to inquire into the different degrees and states of animal life. The first departure from its ordinary and perfect state which strikes us, is in—

1. Sleep. This is either natural or artificial. Natural sleep is induced by a diminution of the excitement and excitability of the system, by the continued application of the stimuli which act upon the body in its waking state. When these stimuli act in a determined degree, that is, when the same number of stimuli act with the same force, and for the same time, upon the system, sleep will be brought on at the same hour every night. But when they act with uncommon force, or for an unusual time, it is brought on at an earlier hour. Thus a long walk or ride, by persons accustomed to a sedentary life, unusual exercise of the understanding, the action of strong passions or emotions, and the continual application of unusual sounds seldom fail of inducing premature sleep. It is recorded of pope Ganganelli, that he slept more soundly, and longer than usual, the night after he was raised to the papal chair. The effects of unusual sounds in bringing on premature sleep, is further demonstrated by that constant inclination to retire to bed at an early hour, which country people discover the first and second days they spend in a city, exposed from morning till night to the noise of hammers, files, and looms, or of drays, carts, wagons, and coaches, rattling over pavements of stone. Sleep is further hastened by the absence of light, the cessation of sounds and labour, and the recumbent posture of the body on a soft bed.

Artificial sleep may be induced at any time by certain stimulating substances, particularly by opium. They act by carrying the system beyond the healthy grade of excitement, to a degree of depression, which Dr. Brown has happily called the sleeping point. The same point may be induced in the system at any time by the artificial abstraction of the usual stimuli of life. For example, let a person shut himself up at mid-day in a dark room, remote from noise of all kinds, let him lie down upon his back upon a soft bed in a temperate state of the atmosphere, and let him cease to think upon interesting subjects, or let him think only upon one subject, and he will soon fall asleep. Dr. Boerhaave relates an instance of a Dutch physician, who, having persuaded himself that waking was a violent state, and sleep the only natural one of the system, contrived, by abstracting every kind of stimulus in the manner that has been mentioned, to sleep away whole days and nights, until at length he impaired his understanding, and finally perished in a public hospital in a state of idiotism.

In thus anticipating a view of the cause of sleep, I have said nothing of the effects of diseases of the brain in inducing it. These belong to another part of our course. The short explanation I have given of its cause was necessary in order to render the history of animal life, in that state of the system, more intelligible.

At the usual hour of sleep there is an abstraction of the stimuli of light, sound, and muscular motion. The stimuli which remain, and act with an increased force upon the body in sleep, are—

1. The heat which is discharged from the body, and confined by means of bed-clothes. It is most perceptible when exhaled from a bed-fellow. Heat obtained in this way has sometimes been employed to restore declining life to the bodies of old people. Witness the damsel who lay for this purpose in the bosom of the king of Israel. The advantage of this external heat will appear further, when we consider how impracticable or imperfect sleep is, when we lie under too light covering in cold weather.

2. The air which applied to the lungs during sleep probably acts with more force than in the waking state. I

am disposed to believe that more air is phlogisticated in sleep than at an other time, for the smell of a close room in which a person has slept one night, we know, is much more disagreeable than that of a room, under equal circumstances, in which half a dozen people have sat for the same number of hours in the day time. The action of decomposed air on the lungs and heart was spoken of in a former lecture. An increase in its quantity must necessarily have a powerful influence upon animal life during the sleeping state.

3. Respiration is performed with a greater extension and contraction of the muscles of the breast in sleep than in the waking state; and this cannot fail of increasing the impetus of the blood in its passage through the heart and blood-vessels. The increase of the fulness and force of the pulse in sleep, is probably owing in part to the action of respiration upon it. In another place I hope to elevate the rank of the blood-vessels in the animal economy, by showing that they are the fountains of power in the body. They derive this pre-eminence from the protection and support they afford to every part of the system. They are the perpetual centinels of health and life: for they never partake in the repose which is enjoyed by the muscles and nerves. During sleep, their sensibility seems to be converted into contractility, by which means their muscular fibres are more easily moved by the blood than in the waking state. The diminution of sensibility in sleep is proved by many facts to be mentioned hereafter; and the change of sensibility into contractility will appear, when we come to consider the state of animal life in infancy and old age.

4. Aliment in the stomach acts more powerfully in sleep than in the waking state. This is evident from digestion going on more rapidly when we are awake than when we sleep. The more slow the digestion, the greater is the stimulus of the aliment in the stomach. Of this we have many proofs in daily life. Labourers object to milk as a breakfast, because it digests too soon; and often call for food in a morning, which they can feel all day in their stomachs. Sausages, fat pork, and onions are generally preferred by them for this purpose. A moderate supper

is favourable to easy and sound sleep; and the want of it, in persons who are accustomed to that meal, is often followed by a restless night. The absence of its stimulus is probably supplied by a full-gall-bladder (which always attends an empty stomach) in persons who are not in the habit of eating suppers.

5. The stimulus of the urine, accumulated in the bladder during sleep, has a perceptible influence upon animal life. It is often so considerable as to interrupt sleep; and it is one of the causes of our waking at a regular hour in the morning. It is moreover a frequent cause of the activity of the understanding and passions in dreams; and hence we dream more in our morning slumbers, when the bladder is full, than we do in the beginning or middle of the night.

6. The fæces exert a constant stimulus upon the bowels in sleep. This is so considerable as to render it less profound when they have been accumulated for two or three days, or when they have been deposited in the extremity of the alimentary canal.

7. The partial and irregular exercises of the understanding and passions in dreams have an occasional influence in promoting life. They occur only where there is a deficiency of other stimuli. Such is the force with which the mind acts upon the body in dreams, that Dr. Brambilla, physician to the emperor of Germany, informs us, that he has seen instances of wounds in soldiers being inflamed, and putting on a gangrenous appearance in consequence of the commotions excited in their bodies by irritating dreams.* The stimulating passions act through the medium of the will; and the exercises of this faculty of the mind sometimes extend so far as to produce actions in the muscles of the limbs, and occasionally in the whole body, as we see in persons who walk in their sleep. The stimulus of lust often awakens us with pleasure or pain, according as we are disposed to respect or disobey the precepts of our

* A fever was excited in Cinna the poet, in consequence of his dreaming that he saw Cæsar, the night after he was assassinated, and was invited to accompany him to a dreary place, to which he pointed, in order to sup with him. Convulsions, and other diseases, I believe, are often excited in the night, by terrifying or distressing dreams.

Plutarch's Life of M. Brutus.

Maker. The angry and revengeful passions often deliver us, in like manner, from the imaginary guilt of murder. Even the debilitating passions of grief and fear produce an indirect operation upon the system that is favourable to life in sleep, for they excite that distressing disease called the night-mare, which prompts us to speak, or halloo, and by thus invigorating respiration, overcomes the languid circulation of the blood in the heart and brain. Do not complain then, gentlemen, when you are bestrode by this midnight hag. She is kindly sent to prevent your sudden death. Persons who go to bed in good health, and are found dead the succeeding morning, are said most commonly to die of this disease.

I proceed now to inquire into the state of animal life in its different stages. I pass over for the present its history in generation. It will be sufficient only to remark in this place that its first motion is produced by the stimulus of the male seed upon the female ovum. This opinion is not originally mine. You will find it in Dr. Haller.* The pungent taste which Mr. John Hunter discovered in the male seed renders it peculiarly fit for this purpose. No sooner is the female ovum thus set in motion, and the fœtus formed, than its capacity of life is supported—

1. By the stimulus of the heat which it derives from its connection with its mother in the womb.

2. By the stimulus of its own circulating blood.

3. By its constant motion in the womb after the third month of pregnancy. The absence of this motion for a few days is always a sign of the indisposition or death of a fœtus. Considering how early a child is accustomed to it, it is strange that a cradle should ever have been denied to it after it comes into the world.

II. In infants there is an absence of many of the stimuli which support life. Their excretions are in a great measure deficient in acrimony, and their mental faculties are too weak to exert much influence upon their bodies. But the absence of stimulus from those causes is amply supplied—

1. By the very great excitability of their systems to

* "Novum fœtum a seminis masculi stimulo vitam concepisse."—*Elementa Physiologia*, vol. viii. p. 177.

those of light, sound, heat, and air. So powerfully do light and sound act upon them, that the Author of nature has kindly defended their eyes and ears from an excess of their impressions by imperfect vision and hearing, for several weeks after birth. The capacity of infants to be acted upon by moderate degrees of heat is evident from their suffering less from cold than grown people. This is so much the case, that we read, in Mr. Umfréville's account of Hudson's Bay, of a child that was found alive upon the back of its mother after she was frozen to death. I before hinted at the action of the air upon the bodies of new-born infants in producing the red colour of their skins. It is highly probable (from a fact formerly mentioned) that the first impression of the atmosphere which produces this redness is accompanied with pain, and this we know is a stimulus of a very active nature. By a kind law of sensation, impressions, that were originally painful, become pleasurable by repetition or duration. This is remarkably evident in the impression now under consideration, and hence we find infants at a certain age discover signs of an increase of life by their delightful gestures, when they are carried into the open air. Recollect further, gentlemen, what was said formerly of excitability predominating over sensibility in infants. We see it daily, not only in their patience of cold, but in the short time in which they cease to complain of the injuries they meet with from falls, cuts, and even severe surgical operations.

2. Animal life is supported in infants by their sucking, or feeding, nearly, every hour in the day and night when they are awake. I explained formerly the manner in which food stimulated the system. The action of sucking supplies, by the muscles employed in it, the stimulus of mastication.

3. Laughing and crying, which are universal in infancy have a considerable influence in promoting animal life, by their action upon respiration, and the circulation of the blood. Laughing exists under all circumstances, independently of education or imitation. The child of the negro slave, born only to inherit the toils and misery of its parents, receives its master with a smile every time he enters his kitchen or a negro-quarter. But laughing exists in infancy

under circumstances still more unfavourable to it: an instance of which is related by Mr. Bruce. After a journey of several hundred miles across the sands of Nubia, he came to a spring of water shaded by a few scrubby trees. Here he intended to have rested during the night, but he had not slept long before he was awakened by a noise which he perceived was made by a solitary Arab, equally fatigued and half famished with himself, who was preparing to murder and plunder him. Mr. Bruce rushed upon him, and made him his prisoner. The next morning he was joined by a half-starved female companion, with an infant of six months old in her arms. In passing by this child, Mr. Bruce says, it laughed and crowed in his face, and attempted to leap upon him. From this fact it would seem as if laughing was not only characteristic of our species, but that it was early and intimately connected with human life. The child of these Arabs had probably never seen a smile upon the faces of its ferocious parents and perhaps had never (before the sight of Mr. Bruce) beheld any other human creature.

Crying has a considerable influence upon health and life in children. I have seen so many instances of its salutary effects, that I have satisfied myself it is as possible for a child to "cry and be fat," as it is to "laugh and be fat."

4. As children advance in life, the constancy of their appetites for food, and their disposition to laugh and cry, lessen, but the diminution of these stimuli is supplied by exercise. The limbs* and tongues of children are always in motion. They continue likewise to eat oftener than adults. A crust of bread is commonly the last thing they ask for at night, and the first thing they call for in the morning. It is now they begin to feel the energy of their mental faculties. This stimulus is assisted in its force by the disposition to prattle, which is so universal among children. This habit of converting their ideas into words as fast as they rise, follows them to their beds, where we

* Niebuhr, in his travels, says the children in Arabia are taught to keep themselves constantly in motion by a kind of vibratory exercise of their bodies. This motion counteracts the the diminution of life, produced by the heat of the climate of Arabia.

often hear them talk themselves to sleep in a whisper, or to use less correct, but more striking terms, by *thinking aloud*.

5. Dreams act at an early period upon the bodies of children. Their smiles, startings, and occasional screams in their sleep appear to arise from them. After the third or fourth year of their lives they sometimes confound them with things that are real. From observing the effects of this mistake upon the memory, a sensible woman whom I once knew, forbade her children to tell their dreams, lest they should contract habits of lying, by confounding imaginary with real events.

6. New objects, whether natural or artificial, are never seen by children without emotions of pleasure, which act upon their capacity of life. Their effect of novelty upon the tender bodies of children may easily be conceived, by its friendly influence upon the health of invalids who visit foreign countries, and who pass months or years in a constant succession of new and agreeable impressions.

III. From the combination of all the stimuli that have been enumerated, human life is generally in excess from fifteen to thirty-five. It is during this period the passions blow a perpetual storm. The most predominating of them is the love of pleasure. No sooner does the system become insensible to this stimulus, than ambition succeeds it in—

IV. The middle stage of life. Here we behold man in the most perfect physical state. The stimuli which now act upon him are so far regulated by prudence, that they are seldom excessive in their force. The habits of order the system acquires in this period, continue to produce good health for many years afterwards; and hence bills of mortality prove that fewer persons die between forty and fifty-seven, than in any other seventeen years of human life.

V. In old age, the senses of seeing, hearing, and touch are impaired. The venereal appetite is weakened, or entirely extinguished. The pulse becomes slow, and subject to frequent intermissions, from a decay of the force of the blood-vessels. Exercise becomes impracticable, or irksome, and the operations of the understanding are performed with languor, and difficulty. In this shattered and

declining state of the system, the absence and diminution of all the stimuli which have been mentioned are supplied—

1. By an increase in the quantity, and by the peculiar quality of the food, which is taken by old people. They generally eat twice as much as persons in middle life, and they bear with pain the usual intervals between meals. They moreover prefer that kind of food which is savoury and stimulating. The stomach of the celebrated Parr, who died in the one hundred and fiftieth year of his age, was found full of strong, nourishing aliment.

2. By the stimulus of the fæces, which are frequently retained for five six days in the bowels of old people.

3. By the stimulus of fluids rendered preternaturally acrid by age. The urine, sweat, and even the tears of old people, possess a peculiar acrimony. Their blood likewise loses part of the mildness which is natural to that fluid; and hence the difficulty with which sores heal in old people; and hence too the reason why cancers are more common in the decline, than in any other period of human life.

4. By the uncommon activity of certain passions. These are either good or evil. To the former belong an increased vigour in the operations of those passions which have for their objects the Divine Being, or the whole family of mankind, or their own offspring, particularly their grand-children. To the latter passions belong malice, a hatred of the manners and fashions of the rising generation, and above all, avarice. This passion knows no holidays. Its stimulus is constant, though varied daily by the numerous means by which it has discovered of increasing, securing, and perpetuating property. It has been observed that weak mental impressions produce much greater effects in old people than persons in middle life. A trifling indisposition in a grand-child, an inadvertent act of unkindness from a friend, or the fear of losing a few shillings, have, in many instances, produced in them a degree of wakefulness that has continued for two or three nights. It is to this highly excitable state of the system that Solomon probably alludes, when he describes the grasshopper as burdensome to old people.

5. By the passion for talking, which is so common, as

to be one of the characteristics of old age. I mentioned formerly the influence of this stimulus upon animal life. Perhaps it is more necessary in the female constitution than in the male: for it has long ago been remarked, that women who are very taciturn are generally unhealthy.

6. By their wearing warmer clothes, and preferring warmer rooms, than in the former periods of their lives. This practise is so uniform, that it would not be difficult, in many cases, to tell a man's age by his dress, or by finding out at what degree of heat he found himself comfortable in a close room.

7. By dreams. These are universal among old people. They arise from their short and imperfect sleep.

8. It has been often said, that "We are once men, and twice children." In speaking of the state of animal life in infancy, I remarked that the contractility of the animal fibres predominated over their sensibility in that stage of life. The same thing takes place in old people, and it is in consequence of the return of this infantile state of the system, that all the stimuli which have been mentioned act upon them with much more force than in middle life. This sameness, in the predominance of excitability over sensibility in children and old people, will account for the similarity of their habits with respect to eating, sleep, exercise and the use of fermented and distilled liquors. It is from the increase of excitability in old people, that so small a quantity of strong drink intoxicates them; and it is from an ignorance of this change in their constitution, that many of them become drunkards, after passing the early and middle stages of life with sober characters.

Life is continued in a less imperfect state in old age in women than in men. The former sew, and knit, and spin, after they lose the use of their ears and eyes; whereas the latter, after losing the use of those senses, frequently pass the evening of their lives in a torpid state in a chimney corner. It is from the influence of moderate and gently stimulating employments upon the female constitution, that more women live to be old than men, and that they rarely survive their usefulness in domestic life.

Hitherto the principles I am endeavouring to establish have been applied to explain the cause of life in its more

common forms. Let us next inquire, how far they will enable us to explain its continuance in certain morbid states of the body, in which there is a diminution of some, and an apparent abstraction of all the stimuli, which have been supposed to produce animal life.

I. We observe some people to be blind, or deaf and dumb, from their birth. The same defects of sight hearing, and speech, are sometimes brought on by diseases. Here animal life is deprived of all those numerous stimuli, which arise from light, colours, sounds, and speech. But the absence of these stimuli is supplied—

II. By increased sensibility and excitability in their remaining senses. The ears, the nose, and the fingers, afford a surface for impressions in blind people, which frequently overbalances the loss of their eye sight. There are two blind young men, brothers, in this city, of the name of Dutton, who can tell when they approach a post in walking across a street, by a peculiar sound which the ground under their feet emits in the neighbourhood of the post. Their sense of hearing is still more exquisite to sounds of another kind. They can tell the names of a number of tame pigeons, with which they amuse themselves in a little garden, by only hearing them fly over their heads. The celebrated blind philosopher, Dr. Moyse, could distinguish a black dress on his friends, by its smell; and we read of many instances of blind persons who have been able to perceive colours by rubbing their fingers upon them. One of these persons, mentioned by Mr. Boyle, has left upon record an account of the specific quality of each colour as it affected his sense of touch. He says black imparted the most, and blue the least, perceptible sense of asperity to his fingers.

2. By an increase of vigour in the exercises of the mental faculties. The poems of Homer, Milton, and Blacklock, and the attainments of Sanderson in mathematical knowledge, all discover how much the energy of the mind is increased by the absence of impressions upon the organs of vision.

II. We sometimes behold life in idiots, in whom there is not only an absence of the stimuli of the understanding and passions, but frequently from the weakness of

their bodies, a deficiency of the loco-motive powers. Here an ordinate appetite for food, or venereal pleasures, or a constant habit of laughing, or talking, or playing with their hands and feet, supply the place of the stimulating operations of the mind, and of general bodily exercise. Of the inordinate force of the venereal appetite in idiots we have many proofs. The Cretins are much addicted to venery; and Dr. Michaelis tells us that the idiot whom he saw at the Passaic falls in New Jersey, who had passed six and twenty years in a cradle, acknowledged that he had venereal desires, and wished to be married, for, the doctor adds, he had a sense of religion upon his fragment of mind, and of course did not wish to gratify that appetite in an unlawful manner.

III. How is animal life supported in persons who pass many days, and even weeks, without food, and in some instances, without drinks? Long fasting is usually the effect of disease, of necessity, or of a principle of religion. When it arises from the first cause, the actions of life are kept up by the stimulus of disease.* The absence of food, when accidental, or submitted to as a mean of producing moral happiness, is supplied—

1. By the stimulus of a full gall bladder. This state of the receptacle of bile has generally been found to accompany an empty stomach. The bile is sometimes absorbed, and imparts a yellow colour to the skin of persons who suffer or die of famine.

2. By increased acrimony in all the secretions and excretions of the body. The saliva becomes so acrid by long fasting, as to excoriate the gums, and the breath acquires not only a fœtor, but a pungency so active, as to draw tears from the eyes of persons who are exposed to it.

3. By increased sensibility and excitability in the sense of touch. The blind man mentioned by Mr. Boyle, who

* The stimulus of a disease sometimes supplies the place of food in prolonging life. Mr. C. S——, a gentleman well known in Virginia, who was afflicted with a palsy, which had resisted the skill of several physicians, determined to destroy himself, by abstaining from food and drinks. He lived *sixty* days without eating any thing, and the greatest part of that time without tasting even a drop of water. His disease probably protracted his life thus long beyond the usual time in which death is induced by fasting. See a particular account of this case, in the first number of the second volume of Dr. Coxe's Medical Museum.

could distinguish colours by his fingers, possessed this talent only after fasting. Even a draught of any kind of liquor deprived him of it. I have taken notice, in my account of the yellow fever in Philadelphia, in the year 1793, of the effects of a diet, bordering on fasting for six weeks, in producing a quickness and correctness in my perceptions of the state of the pulse, which I had never experienced before.

4. By an increase of activity in the understanding and passions. Gamesters often improve the exercises of their minds, when they are about to play for a large sum of money, by living for a day or two upon roasted apples and cold water. Where the passions are excited into preternatural action, the absence of the stimulus of food, is scarcely felt. I shall hereafter mention the influence of the desire of life upon its preservation, under all circumstances. It acts with peculiar force when fasting is accidental. But when it is submitted to as a religious duty, it is accompanied by sentiments and feelings which more than balance the abstraction of aliment. The body of Moses was sustained, probably without a miracle, during an abstinence of forty days and forty nights, by the pleasure he derived from conversing with his Maker "face to face, as a man speaking with his friend."*

I remarked formerly, that the veins discover no deficiency of blood in persons who die of famine. Death from this cause seems to be less the effect of the want of food, than of the combined and excessive operation of the stimuli, which supply its place in the system.

IV. We come now to a difficult inquiry, and that is, how is life supported during the total abstraction of external and internal stimuli which takes place in asphyxia, or in apparent death, from all its numerous causes?

I took notice, in a former lecture, that ordinary life consisted in the excitement and excitability of the different parts of the body, and that they were occasionally changed into each other. In apparent death from violent emotions of the mind, from the sudden impression of miasmata, or from drowning, there is a loss of excitement; but the excitability of the system remains for minutes, and, in

* Exodus xxxiii. 11. xxxiv. 28.

some instances, for hours afterwards unimpaired, provided the accident which produced the loss of excitement, has not been attended with such exertions as are calculated to waste it. If, for example, a person should fall suddenly into the water, without bruising his body, and sink before his fears or exertions had time to dissipate his excitability, his recovery from apparent death might be effected by the gentle action of heat or frictions upon his body, so as to convert his accumulated excitability gradually into excitement. The same condition of the system takes place when apparent death occurs from freezing, and a recovery is accomplished by the same gentle application of stimuli, provided the organization of the body be not injured, or its excitability wasted, by violent exertions previously to its freezing. This excitability is the vehicle of motion, and motion, when continued long enough, produces sensation, which is soon followed by thought; and in these, I said formerly, consists perfect life in the human body.

For this explanation of the manner in which life is suspended and revived, in persons apparently dead from cold, I am indebted to Mr. John Hunter, who supposes, if it were possible for the body to be *suddenly* frozen, by an instantaneous abstraction of its heat, life might be continued for many years in a suspended state, and revived at pleasure, provided the body were preserved constantly in a temperature barely sufficient to prevent re-animation, and never so great as to endanger the destruction of any organic part. The resuscitation of insects, that have been in a torpid state for months, and perhaps years, in substances that have preserved their organization, should at least defend this bold proposition from being treated as chimerical. The effusions even of the imagination of such men as Mr. Hunter, are entitled to respect. They often become the germs of future discoveries.

In that state of suspended animation which occurs in acute diseases, and which has sometimes been denominated a *trance*, the system is nearly in the same excitable state that it is in apparent death from drowning and freezing. Resuscitation, in these cases, is not the effect, as in those which have been mentioned, of artificial applications

made to the body for that purpose. It appears to be spontaneous; but it is produced by impressions made upon the ears, and by the operations of the mind in dreams. Of the actions of these stimuli upon the body in its apparently lifeless state, I have satisfied myself by many facts. I once attended a citizen of Philadelphia, who died of a pulmonary disease, in the 80th year of his age. A few days before his death, he begged that he might not be interred until one week after the usual signs of life had left his body, and gave as a reason for this request, that he had, when a young man, died to all appearance of the yellow fever, in one of the West India islands. In this situation he distinctly heard the persons who attended him, fix upon the time and place of burying him. The horror of being put under ground alive, produced such distressing emotions in his mind, as to diffuse motion throughout his body, and finally excited in him all the usual functions of life. In Dr. Creighton's essay upon mental derangement, there is a history of a case nearly of a similar nature. "A young lady (says the doctor) an attendant on the princess of —, after having been confined to her bed for a great length of time, with a violent nervous disorder, was at last, to all appearance, deprived of life. Her lips were quite pale, her face resembled the countenance of a dead person, and her body grew cold. She was removed from the room in which *she died*, was laid in a coffin, and the day for her funeral was fixed on. The day arrived, and according to the custom of the country, funeral songs and hymns were sung before the door. Just as the people were about to nail on the lid of the coffin, a kind of perspiration was observed on the surface of her body. She recovered. The following is the account she gave of her sensations: she said, "It seemed to her as if in a dream, that she was really dead: yet she was perfectly conscious of all that happened around her. She distinctly heard her friends speaking and lamenting her death at the side of her coffin. She felt them pull on the dead clothes, and lay her in it. This feeling produced a mental anxiety which she could not describe. She tried to cry out, but her mind was without power, and could not act on her body. She had the contradictory feeling as if she were

in her own body, and not in it, at the same time. It was equally impossible for her to stretch out her arm or open her eyes, as to cry, although she continually endeavoured to do so. The internal anguish of her mind was at its utmost height when the funeral hymns began to be sung, and when the lid of the coffin was about to be nailed on. The thought that she was to be buried alive was the first which gave activity to her mind, and enabled it to operate on her corporeal frame."

Where the ears lose their capacity of being acted upon by stimuli, the mind, by its operations in dreams, becomes a source of impressions which again sets the wheels of life in motion. There is an account published by Dr. Arnold, in his observations upon insanity,* of a certain John Engelbreght, a German, who was believed to be dead, and who was evidently resuscitated by the exercises of his mind, upon subjects which were of a delightful or stimulating nature. This history shall be taken from Mr. Engelbreght's words. "It was on Thursday noon (says he) about twelve o'clock, when I perceived that death was making his approaches upon me from the lower parts upwards, insomuch that my whole body became stiff. I had no feeling left in my hands and feet, neither in any other part of my whole body, nor was I at last able to speak or see, for my mouth now becoming very stiff, I was no longer able to open it, nor did I feel it any longer. My eyes also broke in my head in such a manner that I distinctly felt it. For all that, I understood what they said, when they were praying by me, and I distinctly heard them say, feel his legs, how stiff and cold they have become. This I heard distinctly, but I had no perception of their touch. I heard the watchman cry 11 o'clock, but at 12 my hearing left me." After relating his passage from the body to heaven with the velocity of an arrow shot from a cross bow, he proceeds, and says, that as he was twelve hours in dying, so he was twelve hours in returning to life. "As I died (says he) from beneath upwards so I revived again the contrary way, from above to beneath, or from top to toe. Being conveyed back from the heavenly glory, I began to hear something of

* Vol. ii. p. 298.

what they were praying for me, in the same room with me. Thus was my hearing the *first* sense I recovered. After this I began to have a perception of my eyes, so that, by little and little, my whole body became strong and sprightly, and no sooner did I get a feeling of my legs and feet, than I arose and stood firm upon them with a firmness I had never enjoyed before. The heavenly joy I had experienced, invigorated me to such a degree, that people were astonished at my rapid, and almost instantaneous recovery."

The explanation I have given of the cause of resuscitation in this man will serve to refute a belief in a supposed migration of the soul from the body, in cases of apparent death. The imagination, it is true, usually conducts the whole mind to the abodes of happy or miserable spirits, but it acts here in the same way that it does when it transports it, in common dreams, to numerous and distant parts of the world.

There is nothing supernatural in Mr. Engelbreght being invigorated by his supposed flight to heaven. Pleasant dreams always stimulate and strengthen the body, while dreams which are accompanied with distress or labour debilitate and fatigue it.

LECTURE III.

GENTLEMEN,

LET us next take a view of the state of animal life in the different inhabitants of our globe, as varied by the circumstances of civilization, diet, situation, and climate.

I. In the Indians of the northern latitudes of America, there is often a defect of the stimulus of aliment, and of the understanding and passions. Their vacant countenances, and their long disgusting taciturnity, are the effects of the want of action in their brains from a deficiency of ideas; and their tranquillity under all the common circumstances

of irritation, pleasure, or grief, are the result of an absence of passion; for they hold it to be disgraceful to show any outward signs of anger, joy, or even of domestic affection. This account of the Indian character, I know, is contrary to that which is given of it by Rousseau, and several other writers, who have attempted to prove that man may become perfect and happy without the aids of civilization and religion. This opinion is contradicted by the experience of all ages, and is rendered ridiculous by the facts which are well ascertained in the history of the customs and habits of our American savages. In a cold climate they are the most miserable beings upon the face of the earth. The greatest part of their time is spent in sleep, or under the alternate influence of hunger and gluttony. They moreover indulge in vices which are alike contrary to moral and physical happiness. It is in consequence of these habits that they discover so early the marks of old age, and that so few of them are long-lived. The absence and diminution of many of the stimuli of life in these people is supplied in part by the violent exertions with which they hunt and carry on war, and by the extravagant manner with which they afterwards celebrate their exploits, in their savage dances and songs.

II. In the inhabitants of the torrid regions of Africa there is a deficiency of labour; for the earth produces spontaneously nearly all the sustenance they require. Their understandings and passions are moreover in a torpid state. But the absence of bodily and mental stimuli in these people is amply supplied by the constant heat of the sun, by the profuse use of spices in their diet, and by the passion for musical sounds which so universally characterises the African nations.

III. In Greenland the body is exposed during a long winter to such a degree of cold as to reduce the pulse to 40 or 50 strokes in a minute. But the effects of this cold in lessening the quantity of life are obviated in part by the heat of close stove rooms, by warm clothing, and by the peculiar nature of the aliment of the Greenlanders, which consists chiefly of animal food, of dried fish, and of whale oil. They prefer the last of those articles in so rancid a state, that it imparts a fœtor to their perspiration, which Mr. Crantz says, renders even their churches offensive to

strangers. I need hardly add, that a diet possessed of such diffusible qualities cannot fail of being highly stimulating. It is remarkable that the food of all the northern nations of Europe is composed of stimulating animal or vegetable matters, and that the use of spirituous liquors is universal among them.

IV. Let us next turn our eyes to the miserable inhabitants of those eastern countries which compose the Turkish empire. Here we behold life in its most feeble state, not only from the absence of physical, but of other stimuli which operate upon the inhabitants of other parts of the world. Among the poor people of Turkey there is a general deficiency of aliment. Mr. Volney in his *Travels* tells us, "That the diet of the Bedouins seldom exceeds six ounces a day, and that it consists of six or seven dates soaked in buttermilk, and afterwards mixed with a little sweet milk, or curds." There is likewise a general deficiency among them of stimulus from the operations of the mental faculties; for such is the despotism of the government in Turkey, that it weakens not only the understanding, but it annihilates all that immense source of stimuli which arises from the exercises of the domestic and public affections. A Turk lives wholly to himself. In point of time he occupies only the moment in which he exists; for his futurity, as to life and property, belongs altogether to his master. Fear is the reigning principle of his action, and hope and joy seldom add a single pulsation to his heart. Tyranny even imposes a restraint upon the stimulus which arises from conversation, for, "They speak (says Mr. Volney) with a slow feeble voice, as if the lungs wanted strength to propel air enough through the glottis to form distinct articulate sounds." The same traveller adds, that "They are slow in all their motions, that their bodies are small, that they have small evacuations, and that their blood is so destitute of serocity, that nothing but the greatest heat can preserve its fluidity." The deficiency of aliment, and the absence of mental stimuli in these people is supplied—

1. By the heat of their climate,
 2. By their passion for musical sounds and fine clothes.
- And
3. By their general use of coffee, garlic,* and opium.

* Neibuhr's *Travels*.

The more debilitated the body is, the more forcibly these stimuli act upon it. Hence, according to Mr. Volney, the Bedouins, whose slender diet has been mentioned, enjoy good health ; for this consists not in strength, but in an exact proportion being kept up between the excitability of the body, and the number and force of the stimuli which act upon it.

V. Many of the observations which have been made upon the inhabitants of Africa, and of the Turkish dominions, apply to the inhabitants of China and the East Indies. They want, in many instances, the stimulus of animal food. Their minds are, moreover, in a state too languid to act with much force upon their bodies. The absence and efficiency of these stimuli are supplied by,

1. The heat of the climate in the southern parts of those countries.

2. By a vegetable diet abounding in nourishment, particularly rice and beans.

3. By the use of tea in China, and by a stimulating coffee made of the dried and toasted seeds of the *daturastramonium*, in the neighbourhood of the Indian coast. Some of these nations likewise chew stimulating substances, as too many of our citizens do tobacco.

Among the poor and depressed subjects of the governments of the middle and southern parts of Europe, the deficiency of the stimulus of wholesome food, of clothing, of fuel, and of liberty, is supplied, in some countries by the invigorating influence of the christian religion upon animal life, and in others by the general use of tea, coffee, garlic, onions, opium, tobacco, malt liquors, and ardent spirits. The use of each of these stimuli seems to be regulated by the circumstances of climate. In cold countries, where the earth yields its increase with reluctance, and where vegetable aliment is scarce, the want of the stimulus of distension which that species of food is principally calculated to produce is sought for in that of ardent spirits. To the southward of 40°, a substitute for the distension from mild vegetable food is sought for in onions, garlic and tobacco. But further, a uniform climate calls for more of these artificial stimuli than a climate that is exposed to the alternate action of heat and cold, winds and calms, and of wet and dry weather. Savages and ignorant people likewise require more of

them than persons of civilized manners, and cultivated understandings. It would seem from these facts that man cannot exist without *sensation* of some kind, and that when it is not derived from natural means, it will always be sought for in such as are artificial.

In no part of the human species, is animal life in a more perfect state than in the inhabitants of Great Britain,* and the United States of America. With all the natural stimuli that have been mentioned, they are constantly under the invigorating influence of liberty. There is an indissoluble union between moral, political, and physical happiness; and if it be true, that elective and representative governments are most favourable to individual, as well as national prosperity, it follows of course, that they are most favourable to animal life. But this opinion does not rest upon an induction derived from the relation, which truths upon all subjects bear to each other. Many facts prove animal life to exist in a larger quantity and for a longer time, in the enlightened and happy state of Connecticut, in which republican liberty has existed above one hundred and fifty years, than in any other country upon the surface of the globe.

It remains now to mention certain mental stimuli which act nearly alike in the production of animal life, upon the individuals of all the nations in the world. They are,

1. The desire of life. This principal, so deeply and universally implanted in human nature, acts very powerfully in supporting our existence. It has been observed to prolong life. Sickly travellers by sea and land, often live under circumstances of the greatest weakness, till they reach their native country, and then expire in the bosom of their friends. This desire of life often turns the scale in favour of a recovery in acute diseases. Its influence will appear, from the difference in the periods in which death was induced in two persons, who were actuated by opposite passions with respect to life. Atticus, we are told, died of voluntary abstinence from food in five days. In sir William Hamilton's account of the earthquake at Calabria, we read of a girl who lived eleven days without food before she expired. In the former case life, was shortened by an aversion from it; in the latter, it was pro-

* Haller's *Elementa Physiologia*, vol. viii. p. 2. p. 107.

tracted by the desire of it. The late Mr. Brissot, in his visit to this city informed me, that the application of animal magnetism (in which he was a believer) had in no instance cured a disease in a West India slave. Perhaps it was rendered inert, by its not being accompanied by a strong desire of life; for this principle exists in a more feeble state in slaves than in freemen. It is possible likewise the wills and imaginations of these degraded people may have become so paralytic, by slavery, as to be incapable of being excited by the impression of this fanciful remedy.

2. The love of money sets the whole animal machine in motion. Hearts, which are insensible to the stimuli of religion, patriotism, love, and even of the domestic affections, are excited into action by this passion. The city of Philadelphia, between the 10th and 15th of August 1791, will long be remembered by contemplative men, for having furnished the most extraordinary proofs of the stimulus of the love of money upon the human body. A new scene of speculation was produced at that time by the scrip of the bank of the United States. It excited febrile diseases in three persons who became my patients. In one of them, the acquisition of twelve thousand dollars in a few minutes, by a lucky sale brought on madness, which terminated in death in a few days.* The whole city felt the impulse of this paroxysm of avarice. The slow and ordinary means of earning money were deserted, and men of every profession and trade were seen in all our streets hastening to the coffee-house, where the agitation of countenance, and the desultory manners, of all the persons who were interested in this species of gaming, exhibited a truer picture of a bedlam, than of a place appropriated to the transaction of mercantile business. But further, the love of money discovers its stimulus upon the body in a peculiar manner in the games of cards and dice. I have heard of a gentleman in Virginia who passed two whole days and nights in succession at a card table; and it is related in the life of a noted gamester in Ireland, that when he was so ill as to be unable to rise from his chair, he would suddenly revive when

* Dr. Mead relates, upon the authority of Dr. Hales, that more of the successful speculators in the South Sea scheme of 1720 became insane, than of those who had been ruined by it.

brought to the hazard table, by hearing the rattling of the dice.

3. Public amusements of all kinds, such as a horse race, a cockpit, a chase, the theatre, the circus, masquerades, public dinners, and tea parties, all exert an artificial stimulus upon the system, and thus supply the defect of the rational exercises of the mind.

4. The love of dress is not confined in its stimulating operations to persons in health. It acts perceptibly in some cases upon invalids. I have heard of a gentleman in South Carolina, who always relieved himself of a fit of low spirits by changing his dress; and I believe there are few people, who do not feel themselves enlivened by putting on a new suit of clothes.

5. Novelty is an immense source of agreeable stimuli. Companions, studies, pleasures, modes of business, prospects, and situations, with respect to town and country, or to different countries, that are *new*, all exert an invigorating influence upon health and life.

6. The love of fame acts in various ways; but its stimulus is most sensible and durable in military life. It counteracts in many instances the debilitating effects of hunger, cold, and labour. It has sometimes done more, by removing the weakness which is connected with many diseases. In several instances, it has assisted the hardships of a camp life in curing pulmonary consumption.

7. The love of country is a deep seated principle of action in the human breast. Its stimulus is sometimes so excessive, as to induce disease in persons who recently migrate, and settle in foreign countries. It appears in various forms; but exists most frequently in the solicitude, labours, attachments, and hatred of party spirit. All these act forcibly in supporting animal life. It is because newspapers are supposed to contain the measure of the happiness or misery of our country, that they are so interesting to all classes of people. Those vehicles of intelligence, and of public pleasure or pain, are frequently desired with the impatience of a meal, and they often produce the same stimulating effects upon the body.*

* They have been very happily called by Mr. Green in his poem entitled *Spleen*, "the manna of the day."

8. The different religions of the world, by the activity they excite in the mind, have a sensible influence upon human life. Atheism is the worst of sedatives to the understanding and passions. It is the abstraction of thought from the most sublime, and of love from the most perfect, of all possible objects. Man is as naturally a religious, as he is a social and domestic, animal; and the same violence is done to his mental faculties, by robbing him of a belief in a God, that is done by dooming him to live in a cell, deprived of the objects and pleasures of social and domestic life. The necessary and immutable connections between the texture of the human mind, and the worship of an object of some kind, has lately been demonstrated by the atheists of Europe, who, after rejecting the true God, have instituted the worship of nature, of fortune, and of human reason; and, in some instances, with ceremonies of the most expensive and splendid kind. Religions are friendly to animal life, in proportion as they elevate the understanding, and act upon the passions of hope and love. It will readily occur to you, that Christianity, when believed and obeyed, according to its original consistency with itself, and with the divine attributes, is more calculated to produce those effects than any other religion in the world. Such is the salutary operation of its doctrines and precepts upon health and life, that if its divine authority rested upon no other argument, this alone would be sufficient to recommend it to our belief. How long mankind may continue to prefer substituted pursuit and pleasures to this invigorating stimulus is uncertain; but the time, we are assured, will come, when the understanding shall be elevated from its present inferior objects, and the luxated passions be reduced to their original order. This change in the mind of man, I believe will be effected only by the influence of the Christian religion, after all the efforts of human reason to produce it, by means of civilization, philosophy, liberty, and government, have been exhausted to no purpose.

Thus far, gentlemen, we have considered animal life as it respects the human species; but the principles I am endeavouring to establish require that we should take a view of it in animals of every species, in all of which we shall find it depends upon the same causes as in the human body.

And here I shall begin by remarking, that if we should discover the stimuli which support life in certain animals to be fewer in number, or weaker in force, than those which support it in our species, we must resolve it into that attribute of the Deity, which seems to have delighted in variety in all his works.

The following observations apply more or less to all the animals upon our globe.

1. They all possess either hearts, lungs, brains, nerves, or muscular fibres. It is as yet a controversy among naturalists, whether animal life can exist without a brain; but no one has denied muscular fibres, and of course contractility, or excitability, to belong to animal life, in all its shapes.

2. They all require more or less air for their existence. Even the snail inhales it for seven months under ground through a pellicle, which it weaves out of slime, as a covering for its body. If this pellicle at any time becomes too thick to admit the air, the snail opens a passage in it for that purpose. Now air we know acts powerfully in supporting animal life.

3. Many of them possess heat equal to that of the human body. Birds possess several degrees beyond it. Now heat, it was said formerly, acts with great force in the production of animal life.

4. They all feed upon substances more or less stimulating to their bodies. Even water itself, chemistry has taught us, affords an aliment, not only stimulating, but nourishing to many animals.

5. Many of them possess senses more acute and excitable, than the same organs in the human species. These expose surfaces for the action of external impressions, that supply the absence or deficiency of mental faculties.

6. Such of them as are devoid of sensibility possess an uncommon portion of contractility, or simple excitability. This is most evident in the polypus. When cut to pieces, it appears to feel little or no pain.

7. They all possess loco-motive powers in a greater or less degree, and of course are acted upon by the stimulus of muscular motion.

8. Most of them appear to feel a stimulus, from the gratification of their appetites for food, and for venereal

pleasures, far more powerful than that which is felt by our species from the same causes. I shall hereafter mention some facts from Spalanzani upon the subject of generation, that will prove the stimulus, from venery, to be strongest in those animals, in which other stimuli act with the least force. Thus the male frog, during its long connection with its female, suffers its limbs to be amputated, without discovering the least mark of pain, and without relaxing its hold of the object of its embraces.

9. In many animals we behold evident marks of understanding and passion. The elephant, the fox, and the ant, exhibit strong proofs of thought; and where is the school boy that cannot bear testimony to the anger of the bee and the wasp?

10. But what shall we say of those animals, which pass long winters in a state in which there is an apparent absence of the stimuli of heat, exercise, and the motion of the blood. Life in these animals is probably supported,—

1. By such an accumulation of excitability, as to yield to impressions, which to us are imperceptible.

2. By the stimulus of aliment in a state of digestion in the stomach, or by the stimulus of aliment restrained from digestion by means of cold; for Mr. John Hunter has proved, by an experiment on a frog, that cold below a certain degree, checks that animal process.

3. By the constant action of air upon their bodies.

It is possible life may exist in these animals, during their hybernation, in the total absence of impression and motion of every kind. This may be the case, where the torpor from cold has been *suddenly* brought upon their bodies. Excitability here is in an accumulated, but quiescent, state.

11. It remains only under this head to inquire, in what manner is life supported in those animals which live in a cold element, and whose blood is sometimes but a little above the freezing point! It will be a sufficient answer to this question to remark, that heat and cold are relative terms, and that different animals, according to their organization, require very different degrees of heat for their existence. Thirty-two degrees of it are probably as stimulating to some of these cold blooded animals, (as they are called,) as 70° or 80° are to the human body.

It might afford additional support to the doctrine of ani-

mal life which I have delivered, to point out the manner in which life and growth are produced in vegetables of all kinds. But this subject belongs to the professor of botany and natural history,* who is amply qualified to do it justice. I shall only remark, that vegetable life is as much the offspring of stimuli as animal, and that skill in agriculture consists chiefly in the proper application of them. The seed of a plant, like an animal body, has no principle of life within itself. If preserved for many years in a drawer, or in earth, below the stimulating influence of heat, air and water, it discovers no sign of vegetation. It grows, like an animal, only in consequence of stimuli acting upon its *capacity* of life.

From a review of what has been said of animal life, in all its numerous forms and modifications, we see that it is as much an effect of impressions upon a peculiar species of matter, as sound is of the stroke of a hammer upon a bell, or music of the motion of the bow upon the strings of a violin. I exclude therefore the intelligent principle of Whytt, the medical mind of Stahl, the healing powers of Cullen, and the vital principle of John Hunter, as much from the body, as I do an intelligent principle from air, fire, and water.

Upon the opinion of these different authors, I beg leave to add further, that they are all modifications of two errors held by Pythagoras and Epicurus. The former believed and taught what is called the transmigration of souls, that is, that the principal of life, rational and animal, was a kind of elementary body; that it never died; and that it passed from animals that perished, into other animal matter, and thereby imparted to it soul, or what is called life. This opinion accords with the vital principle of Mr. Hunter and Dr. Girtanner, while the *anima medica* of Stahl accords with the doctrine taught by Epicurus, of the globe being animated by a principle called *anima mundi*. Both opinions substitute an intelligent and self-moving principle to the agency of a Supreme Being, in every part of his works. There is a third error connected with this subject, which it may not be improper to mention upon this occasion, and that is, that man consists of spirit, soul, and body—that his spirit resides in his brain, and is concerned only in intellec-

* Dr. Barton.

tual and spiritual exercises—that his soul is diffused through every part of his body, and constitutes what is called his “soulish,” or animal, life. This pagan opinion seems to have tinctured some of the writings of St. Paul, who, though inspired by the Spirit of truth upon theological subjects, was left to follow the opinions of the world in matters of human learning. The doctrine I have delivered, obliges us to consider man as consisting of two parts only ; these are soul, or mind, and body. This view of the nature of man is simple, and accords alike with reason and revelation.

The speaking figures, which are conducted through our country as spectacles to amuse the vulgar, afford a striking illustration of the error of animal life depending upon a self-moving principle in the body. The voice is supposed to come from *within* the figure ; whereas, it is certain it is conveyed there by the reflection of words pronounced by a person external to it.

I have often been struck with the similarity of the controversies upon the origin of moral obligation, of power, and of animal life, and with the similarity of their issue in a simple elementary truth, obvious to the most humble capacities. They are believed to depend upon causes within themselves ; but they are now rescued from an internal and placed upon an external basis. The origin of moral obligation, which was formerly ascribed to utility, to sympathy, and to the fitness of things is now derived wholly from the will of God. The origin of power which was derived for ages from divine or hereditary right now rests exclusively upon the will of the people, while the origin of animal life, which has been, time immemorial, derived from a self-moving power, under the different names that have been mentioned, now reposes, probably for ever, upon external and internal impressions. By means of this doctrine revelation and reason embrace each other, and Moses and the prophets shake hands with Dr. Brown, and all those physicians, who maintain the great and sublime truth which he has promulgated. Think of it, gentlemen, in your closets, and in your beds, and talk of it in your walks, and by your fire-sides. It is the active and wide-spreading seminal principle of all truth in medicine.

It is no uncommon thing for the simplicity of causes to be lost in the magnitude of their effects. By contemplating

the wonderful functions of life, we have strangely overlooked the numerous and obscure circumstances which produce it. Thus the humble but true origin of power in the people, is often forgotten in the splendour and pride of governments. It is not necessary to be acquainted with the precise nature of that form of matter, which is capable of producing life from impressions made upon it. It is sufficient for our purpose to know the fact. It is immaterial, moreover, whether this matter derives its power of being acted upon wholly from the brain, or whether it be in part inherent in animal fibres. The inferences are the same in favour of life being the effect of stimuli, and of its being as truly mechanical, as the movements of a clock from the pressure of its weights, or the passage of a ship in the water from the impulse of winds and tide.

The infinity of effects, from similar causes, has often been taken notice of in the works of the Creator. It would seem as if they had all been made after one pattern. The late discovery of the cause of combustion has thrown great light upon our subject. Wood and coal are no longer believed to contain a principle of fire. The heat and flame they emit are derived from an agent altogether external to them. They are produced by a matter, which is absorbed from the air by means of its decomposition. This matter acts upon the predisposition of the fuel to receive it, in the same way that stimuli act upon the human body. The two agents differ only in their effects. The former produces the destruction of the bodies upon which it acts, while the latter excites the more gentle and durable motions of life. Common language in expressing these effects is correct, as far as it relates to their cause. We speak of a coal of fire being *alive*, and of the *flame* of life.

The causes of life which I have delivered will receive considerable support, by contrasting them with the causes of death. This catastrophe of the body consists in such a change, induced on it by disease or old age, as to prevent its exhibiting the phenomena of life. It is brought on,—

1. By the abstraction of all the stimuli which support life. Death from this cause is produced by the same mechanical means, that the emission of sound from a violin is prevented by the abstraction of the bow from its strings.
2. By the excessive force of stimuli of all kinds. No

more occurs here, than happens from too much pressure upon the strings of a violin, preventing its emitting musical tones.

3. By too much relaxation, or too weak a texture of the matter which composes the human body. No more occurs here, than is observed in the extinction of sound by the total relaxation or slender combination of the strings of a violin.

4. By an error in the place of certain fluid or solid parts of the body. No more occurs here, than would happen from fixing the strings of a violin upon its body, instead of elevating them upon its bridge.

5. By the action of poisonous exhalations, or of certain fluids vitiated in the body, upon parts which emit most forcibly the motions of life. No more happens here, than occurs from enveloping the strings of a violin in a piece of wax.

6. By the solution of continuity, by means of wounds in solid parts of the body. No more occurs in death from this cause, than takes place when the emission of sounds from a violin is prevented by a rupture of its strings.

7. Death is produced by a preternatural rigidity, and in some instances by an ossification of the solid parts of the body in old age, in consequence of which they are incapable of receiving and emitting the motions of life. No more occurs here, than would happen if a stick or pipe-stem were placed, in the room of catgut, upon the bridges of the violin. But death may take place in old age, without a change in the texture of animal matter, from the stimuli of life losing their effect by repetition, just as opium, from the same cause, ceases to produce its usual effects upon the body.

Should it be asked, what is that peculiar organization of matter, which enables it to emit life, when acted upon by stimuli, I answer, I do not know. It is true, the votaries of chemistry have lately attempted to imitate it; but no arrangements of matter by their hands have ever produced a single living fibre, nor have any of their compounds produced a substance endowed with the properties of dead animal matter. Lavoissier laboured in vain to produce that simple animal substance we call bile. That the human body is composed of certain matters which belong to the objects of

chemistry, there can be no doubt; but their proportions, and manner of aggregation, are unknown to us; nor are the products, when obtained by fire, the same in form, number, or proportion, which existed in the body in its living state. But admitting this medico-chemical theory of animal life to be demonstrated, it does not in the least degree militate against the doctrine which I have taught. Let us suppose a chemist to have discovered all the matters which compose an animal body, and to have arranged them in their exact order and proportions, they cannot in this situation assume the properties of life, without the impression of some agent upon them. A stimulus of some kind must give them activity. Even the matter of phosphorus torpid, when confined in a phial. It requires the stimulus of air to impart to it its blazing life. It is remarkable, that some of the ancient philosophers had more correct ideas of the origin of animal life than some of our modern chemists. This is elegantly illustrated in the fable of Prometheus. He was unable, by any chemical combination, to animate his image of clay, until he stole fire, or an external stimulus from heaven, for that purpose. As well might we suppose thinking to be a chemical process, as motion and sensation. They are all alike the effects of impression. We think by force, as well as live by force. If any man doubt the truth of this assertion, let him suspend, for a moment, the operations of his mind, or, in other words, let him cease to think. As well might he attempt to stop the pulsation of his heart, by the action of his will, or to arrest the planets in their course, by holding up his finger. Here then let us limit our inquiries, and remain satisfied with facts which are obvious, and capable of application to all the useful purposes of medicine.

The great Creator has kindly established a witness of his unsearchable wisdom in every part of his works, in order to prevent our forgetting him, in the successful exercises of our reason. Mahomet once said, "that he should believe himself to be a God, if he could bring down rain from the clouds, or give life to an animal." It belongs exclusively to the true God to endow matter with those singular properties, which enable it, under certain circumstances, to exhibit the appearances of life.

I cannot conclude this subject, without taking notice of

its extensive application to medicine, metaphysics, theology, and morals.

The doctrine of animal life which has been taught exhibits, in the

First place, a new view of the nervous system, by discovering its origin in the extremities of the nerves on which impressions are made, and its termination in the brain. This idea is extended in an ingenious manner by Mr. Valli, in his treatise upon animal electricity.

2. It discovers to us the true means of promoting health and longevity, by proportioning the number and force of stimuli to the age, climate, situation, habits, and temperament of the human body.

3. It leads us to a knowledge of the causes of all diseases. These consist in excessive or preternatural excitement in certain parts, of the human body, accompanied *generally* with irregular motions, and induced by natural or artificial stimuli. The latter have been called, very properly, by Mr. Hunter, *irritants*. The occasional absence of motion in acute diseases is the effect only of the excess of impetus in their remote causes.

4. It discovers to us that the cure of all diseases depends simply upon the abstraction of stimuli from the whole, or from a part, of the body, when the motions excited by them are in excess; and in the increase of their number and force, when motions are of a moderate nature. For the former purpose, we employ a class of medicines known by the name of sedatives. For the latter, we make use of stimulants. Under these two extensive heads are included all the numerous articles of the *materia medica*.

5. It enables us to reject the doctrine of innate ideas, and to ascribe all our knowledge of sensible objects to impressions acting upon an *innate* capacity to receive ideas. Where it possible for a child to grow up to manhood without the use of any of its senses, it would not possess a single idea of a material object; and as all human knowledge is compounded of simple ideas, this person would be as destitute of knowledge of every kind, as the grossest portion of vegetable or fossil matter.

6. The account which has been given of animal life furnishes a striking illustration of the origin of human actions, by the impression of motives upon the will. As well

might we admit an inherent principle of life in animal matter, as a self-determining power in this faculty of the mind. Motives are necessary, not only to constitute its *freedom*, but its *essence*; for, without them, there could be no more a will, than there could be vision without light, or hearing without sound. It is true, they are often so obscure as not to be perceived, and they sometimes become insensible from habit; but the same things have been remarked in the operation of stimuli, and yet we do not upon this account deny their agency in producing animal life. In thus deciding in favour of the necessity of motives to produce actions, I cannot help bearing a testimony against the gloomy misapplication of this doctrine by some modern writers. When properly understood, it is calculated to produce the most comfortable views of the divine government, and the most beneficial effects upon morals and human happiness.

7. There are errors of an impious nature, which sometimes obtain a currency, from being disguised by innocent names. The doctrine of animal life that has been delivered is directly opposed to an error of this kind, which has had the most baneful influence upon morals and religion. To suppose a principle to reside necessarily and constantly in the human body, which acted independently of external circumstances, is to ascribe to it an attribute, which I shall not connect, even in language, with the creature man. Self-existence belongs only to God.

The best criterion of the truth of a philosophical opinion is, its tendency to produce exalted ideas of the Divine Being, and humble views of ourselves. The doctrine of animal life, which has been delivered is calculated to produce these effects in an eminent degree; for

8 It does homage to the Supreme Being, as the governor of the universe, and establishes the certainty of his universal and particular providence. Admit a principle of life in the human body, and we open a door for the restoration of the old Epicurean or atheistical philosophy which has been mentioned. The doctrine I have taught cuts the sinews of that error; for by rendering the *continuance* of animal life, no less than its commencement, the effect of the constant operation of divine power and goodness, it leads us to believe that the whole creation is supported in the same manner. It leads us further to distinguish be-

tween the works of the Creator of the universe, and the works of a common architect. It has been supposed by some men, that the author of our world formed all its wonderful machinery as a man makes a clock, and, having wound it up, threw it out of his hands, and afterwards retired to rest, or employ himself in other acts of creating power; or if this were not the case, that he committed the care of his works to certain deputies, called nature in the inanimate, and vital principle in the animated parts of the globe. This idea is contrary to the whole tenor of revelation. The Being that created our world never takes his hand, nor his eye, for a single moment, from any part of it. He constantly

“ Warms in the sun, refreshes in each breeze,
 “ Glows in the stars, blossoms in the trees,
 “ Lives through all life, extends through all extent,
 “ Spreads undivided, operates unspent.”

His providence is one continued act of creating power. The sun rises (to use the words of a late elegant writer*) only because he says every morning, “let there be light.” The moon and the stars supply the absence of the sun, only because he says every evening, “let there be lights in the firmament of heaven, to divide the day from the night.” The seasons of spring and autumn return, only because he says, “let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit according to its kind;” and even man exists, only because he breathes into his nostrils the breath, or air, of life, not only at his birth, but every moment of his existence.

9. The view that has been given of the dependent state of man for the blessing of life leads us to contemplate, with very opposite and inexpressible feelings, the sublime idea which is given of the Deity in the scriptures, as possessing life “within himself.” This divine prerogative has never been imparted but to one Being, and that is the Son of God. This appears from the following declaration. “For as the Father hath life in himself so hath he given to the Son to have life *within himself*.”† To this plenitude of independent life we are to ascribe his being called, the “life of the world,” “the prince of life,” and “life” itself, in the

* Mr. Fawcett.

† John v. verse 26.

New Testament. These divine epithets, which are very properly founded upon the manner of our Saviour's existence, exalt him infinitely above simple humanity, and establish his divine nature upon the basis of reason, as well as revelation.

10. We have heard that some of the stimuli, which produce animal life, are derived from the moral and physical evils of our world. From beholding these instruments of death thus converted by divine skill into the means of life, we are led to believe goodness to be the supreme attribute of the Deity and that it will appear finally to predominate in all his works.

11. The doctrine which has been delivered is calculated to humble the pride of man, by teaching him his constant dependence upon his Maker for his existence, and that he has no pre-eminence, in his tenure of it, over the meanest insect that flutters in the air, or the humblest plant that grows upon the earth. What an inspired writer says of the innumerable animals which inhabit the ocean, may with equal propriety be said of the whole human race. "Thou sendest forth thy spirit, and they are created. 'Thou takest away their breath,—they die, and return to their dust.'" Let us not complain of this tenure of our lives. By taking their capital out of our hands, and dealing it out to us according to our necessities, our benevolent Creator prevents our squandering it away without judgment or prudence, and thus becoming bankrupts in life as soon as we began to exist.

12. Melancholy indeed would have been the issue of all our inquiries, did we take a final leave of the human body in its state of decomposition in the grave. Revelation furnishes us with an elevating and comfortable assurance that this will not be the case. The precise manner of its re-organization, and the new means of its future existence, are unknown to us. It is sufficient to believe the event will take place, and that, after it, the soul and body of man will be exalted, in one respect, to an equality with their Creator. They will be immortal.

Here gentlemen, we close the history of animal life. I feel as if I had waded across a rapid and dangerous stream. Whether I have gained the opposite shore with my head clean, or covered with mud and weeds, I leave wholly to your determination.

AN INQUIRY
INTO THE
NATURAL HISTORY OF MEDICINE
AMONG THE
INDIANS OF NORTH AMERICA :
AND A
COMPARATIVE VIEW
OF THEIR
DISEASES AND REMEDIES WITH THOSE OF CIVILIZED NATIONS.

READ BEFORE THE AMERICAN PHILOSOPHICAL SOCIETY, HELD AT PHILADELPHIA,
ON THE FOURTH OF FEBRUARY, 1774.

AN INQUIRY, &c.

GENTLEMEN,*

I RISE with peculiar diffidence to address you upon this occasion, when I reflect upon the entertainment you proposed to yourselves from the eloquence of that learned member Mr. CHARLES THOMPSON, whom your suffrages appointed to this honour, after the delivery of the last anniversary oration. Unhappily for the interests of science, his want of health has not permitted him to comply with your appointment. I beg therefore, that you would forget, for a while, the abilities necessary to execute this task with propriety, and listen with candour to the efforts of a member, whose attachment to the society was the only qualification that entitled him to the honour of your choice.

The subject I have chosen for this evening's entertainment is, "An inquiry into the natural history of medicine among the Indians in North America, and a comparative view of their diseases and remedies with those of civilized nations." You will readily anticipate the difficulty of doing justice to this subject. How shall we distinguish between the original diseases of the Indians and those contracted from their intercourse with the Europeans? By what arts shall we persuade them to discover their remedies? And lastly, how shall we come at the knowledge of facts, in that cloud of errors in which the credulity of the Europeans, and the superstition of the Indians, have involved both their diseases and remedies? These difficulties serve to increase the importance of our subject.

* This INQUIRY was the subject of an Anniversary Oration. The style of an oration is therefore preserved in many parts of it.

If I should not be able to solve them, perhaps I may lead the way to more successful endeavours for that purpose.

I shall first limit the tribes of Indians, who are to be the objects of this inquiry, to those who inhabit that part of North-America which extends from the 30th to the 60th degree of latitude. When we exclude the Esquimaux, who inhabit the shores of Hudson's bay, we shall find a general resemblance in the colour, manners, and state of society, among all the tribes of Indians, who inhabit the extensive tract of country above-mentioned.

Civilians have divided nations into savage, barbarous, and civilized. The savage live by fishing and hunting; the barbarous, by pasturage or cattle; and the civilized, by agriculture. Each of these is connected together in such a manner, that the whole appear to form different parts of a circle. Even the manners of the most civilized nations partake of those of the savage. It would seem as if liberty and indolence were the highest pursuits of man; and these are enjoyed in their greatest perfection by savages, or in the practice of customs which resemble those of savages.

The Indians of North America partake chiefly of the manner of savages. In the earliest accounts we have of them, we find them cultivating a spot of ground. The maize is an original grain among them. The different dishes of it which are in use among the white people still retain Indian names.

It will be unnecessary to show that the Indians live in a state of society adapted to all the exigencies of their mode of life. Those who look for the simplicity and perfection of the state of nature must seek it in systems, as absurd in philosophy as they are delightful in poetry.

Before we attempt to ascertain the number or history of the diseases of the Indians, it will be necessary to inquire into those customs among them which we know influence diseases. For this purpose I shall—

First, Mention a few facts which relate to the birth and treatment of their children.

Secondly, I shall speak of their diet.

Thirdly, Of the customs which are peculiar to the sexes, and—

Fourthly, Of those customs which are common to them both.*

I. Of the birth and treatment of their children.

Much of the future health of the body depends upon its original stamina. A child born of healthy parents always brings into the world a system formed by nature to resist the causes of diseases. The treatment of children among the Indians tends to secure their hereditary firmness of constitution. Their first food is their mother's milk. To harden them against the action of heat and cold (the natural enemies of health and life among the Indians) they are plunged every day into cold water. In order to facilitate their being moved from place to place, and at the same time to preserve their shape, they are tied to a board, where they lie on their backs for six, ten, or eighteen months. A child generally sucks its mother till it is two years old, and sometimes longer. It is easy to conceive how much vigour their bodies must acquire from their simple but wholesome nourishment. The appetite we some times observe in children for flesh is altogether artificial. The peculiar irritability of the system in infancy forbids stimulating aliment of all kinds. Nature never calls for animal food, till she has provided the child with those teeth which are necessary to divide it. I shall not undertake to determine how far the wholesome quality of the mother's milk is increased, by her refusing the embraces of her husband during the time of giving suck.

II. The diet of the Indians is of a mixed nature, being partly animal, and partly vegetable. Their animals are wild and therefore easy of digestion. As the Indians are naturally more disposed to the indolent employment of fishing than hunting, in summer, so we find them living more upon fish than land animals, in that season of the year. Their vegetables consist of roots and fruits, mild

* Many of the facts contained in the Natural History of Medicine among the Indians, in this Inquiry, are taken from La Hontan and Charlevoix's histories of Canada; but the most material of them are taken from persons who had lived or travelled among the Indians. The author acknowledges himself indebted in a particular manner to Mr. Edward Hand, surgeon in the 18th regiment, afterwards brigadier-general in the army of the United States, who during several years' residence at Fort Pitt, directed his inquiries into their customs, diseases, and remedies, with a success that does equal honour to his ingenuity and diligence,

in themselves, or capable of being made so by the action of fire. Although the interior parts of our continent abound with salt springs, yet I cannot find that the Indians used salt in their diet, till they were instructed to do so by the Europeans. The small quantity of fixed alkali contained in the ashes on which they roasted their meat, could not add much to its stimulating quality. They preserve their meat from putrefaction, by cutting it into small pieces, and exposing it in summer to the sun, and in winter to the frost. In the one case its moisture is dissipated, and in the other so frozen, that it cannot undergo the putrefactive process. In dressing their meat, they are careful to preserve its juices. They generally prefer it in the form of soups. Hence we find that among them the use of the spoon preceded that of knife and fork. They take the same pains to preserve the juice of their meat when they roast it, by turning it often. The efficacy of this animal juice, in dissolving meat in the stomach, has not been equalled by any of those sauces or liquors, which modern luxury has mixed with it for that purpose.

The Indians have no set time for eating, but obey the gentle appetites of nature as often as they are called by them. After whole days spent in the chase, or in war, they often commit those excesses in eating, to which long abstinence cannot fail of prompting them. It is common to see them spend three or four hours in satisfying their hunger. This is occasioned, not more by the quantity they eat, than by the pains they take in masticating it. They carefully avoid drinking water in their marches, from an opinion that it lessens their ability to bear fatigue.

III. We now come to speak of those customs which are peculiar to the sexes. And, first, of those which belong to the women. They are doomed by their husbands to such domestic labour as gives a firmness to their bodies, bordering upon the masculine. Their menses seldom begin to flow before they are eighteen or twenty years of age, and generally cease before they are forty. They have them in small quantities, but at regular intervals. They seldom marry till they are about twenty. The constitution has now acquired a vigour, which enables it the better to support the convulsions of child-bearing.

This custom likewise guards against a premature old age. Doctor Bancroft ascribes the haggard looks, the loose hanging breasts, and the prominent bellies of the Indian women at Guiana, entirely to their bearing children too early.* Where marriages are unfruitful (which is seldom the case) a separation is obtained by means of an easy divorce; so that they are unacquainted with the disquietudes which sometimes arise from barrenness. During pregnancy, the women are exempted from the more laborious parts of their duty: hence miscarriages rarely happen among them. Nature is their only midwife. Their labours are short, and accompanied with little pain. Each woman is delivered in a private cabin, without so much as one of her own sex to attend her. After washing herself in cold water, she returns in a few days to her usual employments; so that she knows nothing of those accidents, which proceed from the carelessness or ill management of midwives; or those weaknesses, which arise from a month's confinement in a warm room. It is remarkable that there is hardly a period in the interval between the eruption and the ceasing of the menses, in which they are not pregnant or giving suck. This is the most natural state of the constitution during that interval; and hence we often find it connected with the best state of health in the women of civilized nations.

The customs peculiar to the Indian **MEN** consist chiefly in those employments which are necessary to preserve animal life, and to defend their nation. These employments are hunting and war, each of which is conducted in a manner that tends to call forth every fibre into exercise, and to ensure them the possession of the utmost possible health. In times of plenty and peace, we see them sometimes rising from their beloved indolence and shaking off its influence by the salutary exercises of dancing and swimming. The Indian men seldom marry before they are thirty years of age (they no doubt derive considerable vigour from this custom; for while they are secured by it from the enervating effects of the premature dalliance of love, they may ensure more certain fruitfulness to their wives, and entail more certain health upon their

* Natural History of Guiana.

children. Tacitus describes the same custom among the Germans, and attributes to it the same good effects. "Sera juvenum venus, eoque inexhausta pubertas; nec virginis festinantur: eadem juvena, similis proceritas, pares validique miscentur; ac robora parentum liberi referunt."*

Among the Indian men, it is deemed a mark of heroism to bear the most exquisite pain without complaining; upon this account they early inure themselves to burning part of their bodies with fire, or cutting them with sharp instruments. No young man can be admitted to the honours of manhood or war, who has not acquitted himself well in these trials of patience and fortitude. It is easy to conceive how much this contributes to give a tone to the nervous system, which renders it less subject to the occasional causes of diseases.

IV. We come now to speak of those customs which are common to both sexes: these are PAINTING, and the use of the COLD BATH. The practice of anointing the body with oil is common to the savages of all countries; in warm climates it is said to promote longevity, by checking excessive perspiration. The Indians generally use bear's grease, mixed with a clay which bears the greatest resemblance to the colour of their skins. This pigment serves to lessen the sensibility of the extremities of the nerves; it moreover fortifies them against the action of those exhalations, which we shall mention hereafter as a considerable source of their diseases. The COLD BATH likewise fortifies the body, and renders it less subject to those diseases which arise from the extremes and vicissitudes of heat and cold. We shall speak hereafter of the Indian manner of using it.

It is a practice among the Indians never to drink before dinner, when they work or travel. Experience teaches, that filling the stomach with cold water in the forenoon weakens the appetite, and makes the system more sensible of heat and fatigue.

* Cæsar in his history of the Gallic war, gives the same account of the ancient Germans. His words are, "Qui diutissimi impuberes permanserunt, maximam inter suos ferunt laudem; hoc ali staturam, ali vires, nervasque confirmari putant." Lib. vi. xxi.

The state of society among the Indians excludes the influence of most of those passions which disorder the body. The turbulent effects of anger are concealed in deep and lasting resentments. Envy and ambition are excluded by their equality of power and property. Nor is it necessary that the perfections of the whole sex should be ascribed to one, to induce them to marry. "The weakness of love (says Dr. Adam Smith) which is so much indulged in ages of humanity and politeness, is regarded among savages as the most unpardonable effeminacy. A young man would think himself disgraced for ever, if he showed the least preference of one woman above another, or did not express the most complete indifference, both about the time when, and the person to whom, he was to be married."* Thus are they exempted from those violent or lasting diseases, which accompany the several stages of such passions in both sexes among civilized nations.

It is remarkable that there are no deformed Indians. Some have suspected, from this circumstance, that they put their deformed children to death; but nature here acts the part of an unnatural mother. The severity of the Indian manners destroys them.†

From a review of the customs of the Indians, we need not be surprised at the stateliness, regularity of features, and dignity of aspect, by which they are characterized. Where we observe these among ourselves, there is always a presumption of there being accompanied with health, and a strong constitution. The circulation of the blood is more languid in the Indians, than in persons who are in the constant exercise of the habits of civilized life. Out of eight Indian men whose pulses I once examined at the wrists, I did not meet with one, in whom the artery beat more than sixty strokes in a minute.

The marks of old age appear more early among Indian, than among civilized nations.

Having finished our inquiry into the physical customs

* Theory of Moral sentiments.

† Since the intercourse of the white people with the Indians, we find some of them deformed in their limbs. This deformity, upon inquiry, appears to be produced by those accidents, quarrels, &c. which have been introduced among them by spirituous liquors.

of the Indians, we shall now proceed to inquire into their diseases.

A celebrated professor of anatomy has asserted, that we could not tell, by reasoning *à priori*, that the body was mortal, so intimately woven with its texture are the principles of life. Lord Bacon declares that the only cause of death which is natural to man, is that from old age; and complains of the imperfection of physic, in not being able to guard the principle of life until the whole of the oil that feeds it is consumed. We cannot as yet admit this proposition of our noble philosopher. In the inventory of the grave, in every country, we find more of the spoils of youth and manhood than of age. This must be attributed to moral as well as physical causes.

We need only recollect the custom among the Indians, of sleeping in the open air in a variable climate; the alternate action of heat and cold upon their bodies; to which the warmth of their cabins exposes them; their long marches; their excessive exercise; their intemperance in eating, to which their long fasting and their public feasts naturally prompt them; and, lastly, the vicinity of their habitations to the banks of rivers; in order to discover the empire of diseases among them, in every stage of their lives. They have in vain attempted to elude the general laws of mortality, while their mode of life subjects them to these remote, but certain, causes of diseases.

From what we know of the action of these powers upon the human body, it will hardly be necessary to appeal to facts, to determine that **FEVERS** constitute the only diseases among the Indians. These fevers are occasioned by the insensible qualities of the air. Those which are produced by cold and heat are of the inflammatory kind, such as pleurisies, peripneumonies, and rheumatisms. Those which are produced by the insensible qualities of the air, or by putrid exhalations, are intermitting, remitting, inflammatory and malignant, according as the exhalations are combined with more or less heat or cold. The **DYSENTERY** (which is an Indian disease) comes under the class of fevers. It appears to be the *febris introversa* of Dr. Sydenham.

The Indians are subject to **ANIMAL** and **VEGETABLE**

POISONS. The effects of these upon the body are, in some degree, analogous to the exhalations we have mentioned. When they do not bring on sudden death, they produce, according to their force, either a common inflammatory, or a malignant, fever.

The SMALL POX and the VENEREAL DISEASE were communicated to the Indians of North America by the Europeans. Nor can I find that they were ever subject to the SCURVY. Whether this was obviated by their method of preserving their flesh, or by their mixing it at all times with vegetables, I shall not undertake to determine. Their peculiar customs and manners seem to have exempted them from this, as well from the common diseases of the skin.

I have heard of two or three cases of the GOUT among the Indians, but it was only among those who had learned the use of rum from the white people. A question naturally occurs here, and that is, why does not the gout appear more frequently among that class of civilized people, who consume the greatest quantity of rum? To this I answer, that the effects of this liquor upon those enfeebled people are too sudden, and violent, to admit of their being thrown upon the extremities; as we know them to be among the Indians. They appear only in visceral obstructions, and a complicated train of chronic diseases. Thus putrid miasmata are sometimes too strong to bring on a fever, but produce instant debility and death. The gout is seldom heard of in Russia, Denmark, or Poland. Is this occasioned by the vigour of constitution peculiar to the inhabitants of those northern countries? or is it caused by their excessive use of spirituous liquors, which produce the same chronic complaints among them, which we said were common among the lower class of people in this country? The similarity of their diseases makes the last of these suppositions the most probable. The effects of wine, like tyranny in a well formed government, are felt first in the extremities: while spirits, like a bold invader, seize at once upon the vitals of the constitution.

After much inquiry, I have not been able to find a single instance of FATUITY among the Indians, and but few instances of MELANCHOLY and MADNESS; nor can I find

any accounts of diseases from WORMS among them. Worms are common to most animals ; they produce diseases only in weak, or increase them in strong, constitution.* Hence they have no place in the nosological systems of physic. Nor is DENTITION accompanied by disease among the Indians. The facility with which the healthy children of healthy parents cut their teeth, among civilized nations, gives us reason to conclude that the Indian children never suffer from this quarter.

The Indians appear moreover to be strangers to diseases and pains in the teeth.

The employments of the Indians subject them to many accidents ; hence we sometimes read of WOUNDS, FRACTURES and LUXATIONS, among them.

Having thus pointed out the natural diseases of the Indians, and shown what diseases are foreign to them, we may venture to conclude, that FEVERS, OLD AGE, CASUALTIES, and WAR, are the only natural outlets of human life. War is nothing but a disease ; it is founded in the imperfection of political bodies, just as fevers are founded on the weakness of the animal body. Providence in these diseases seems to act like a mild legislature, which mitigates the severity of death, by inflicting it in a manner the least painful, upon the whole, to the patient and the survivors.

Let us now inquire into the REMEDIES of the Indians. These, like their diseases, are simple, and few in number. Among the first of them, we shall mention the POWERS OF NATURE. Fevers, we said formerly, constituted the chief of the diseases among the Indians ; they are likewise, in the hands of nature, the principal instruments to remove the evils which threaten her dissolution ; but the event of these efforts of nature, no doubt, soon convinced the Indians of the danger of trusting her in all cases ; and hence, in the earliest accounts we have of their manners, we read of persons who were intrusted with the office of physicians.

It will be difficult to find out the exact order in which

* Indian children are not exempted from worms. It is common with the Indians, when a fever in their children is ascribed by the white people to worms (from their being discharged occasionally in their stools) to say, "the fever makes the worms come, and not the worms the fever."

the Indian remedies were suggested by nature, or discovered by art; nor will it be easy to arrange them in proper order. I shall, however, attempt it, by reducing them to NATURAL and ARTIFICIAL.

To the class of NATURAL REMEDIES belongs the Indian practice, of abstracting from their patients all kinds of stimulating aliment. The compliance of the Indians with the dictates of nature, in the early stage of a disease, no doubt, prevents, in many cases, their being obliged to use any other remedy. They follow nature still closer, in allowing their patients to drink plentifully of cold water; this being the only liquor a patient calls for in a fever.

Sweating is likewise a natural remedy. It was probably suggested by observing fevers to be terminated by it. I shall not inquire how far these sweats are essential to the crisis of a fever. The Indian mode of procuring this evacuation is as follows: the patient is confined in a close tent, or wigwam, over a hole in the earth, in which a red hot stone is placed; a quantity of water is thrown upon this stone, which instantly involves the patient in a cloud of vapour and sweat; in this situation he rushes out, and plunges himself into a river, from whence he retires to his bed. If the remedy has been used with success, he rises from his bed in four and twenty hours perfectly recovered from his indisposition. This remedy is used not only to cure fevers, but remove that uneasiness which arises from fatigue of body.

A third natural remedy among the Indians is, PURGING. The fruits of the earth, the flesh of birds, and other animals feeding upon particular vegetables, and, above all, the spontaneous efforts of nature, early led the Indians to perceive the necessity and advantages of this evacuation.

VOMIT^{TS} constitute their fourth natural remedy. They were probably, like the former, suggested by nature, and accident. The ipecacuanha is one of the many roots they employ for that purpose.

The ARTIFICIAL REMEDIES made use of by the Indians are, BLEEDING, CAUSTICS, and ASTRINGENT medicines. They confine bleeding entirely to the part affected. To know that opening a vein in the arm, or

foot, would relieve a pain in the head or side, supposes some knowledge of the animal economy, and therefore marks an advanced period in the history of medicine.

Sharp stones and thorns are the instruments they use to procure a discharge of blood.

We have an account of the Indians using something like a POTENTIAL CAUSTIC, in obstinate pains. It consists of a piece of rotten wood, called *punk*, which they place upon the part affected, and afterwards set it on fire: the fire gradually consumes the wood, and its ashes burn a hole in the flesh.

The undue efforts of nature, in those fevers which are connected with a diarrhœa, or a dysentery, together with those hemorrhages to which their mode of life exposed them, necessarily led them to an early discovery of some ASTRINGENT VEGETABLES. I am uncertain whether the Indians rely upon astringent, or any other vegetables, for the cure of the intermitting fever. This disease among them probably requires no other remedies than the cold bath, or cold air. Its greater obstinacy, as well as frequency, among ourselves, must be sought for in the greater feebleness of our constitutions, and in that change which our country has undergone, from meadows, mill-dams, and the cutting down of woods; whereby morbid exhalations have been multiplied, and their passage rendered more free, through every part of the country.

This is a short account of the remedies of the Indians. If they are simple, they are like their eloquence full of strength; if they are few in number, they are accommodated, as their languages are to their ideas, to the whole of their diseases.

We said, formerly, that the Indians were subject to ACCIDENTS, such as wounds, fractures, and the like. In these cases, nature performs the office of a surgeon. We may judge of her qualifications for this office, by observing the marks of wounds and fractures which are sometimes discovered on wild animals. But further, what is the practice of our modern surgeons in these cases? Is it not to lay aside plaisters and ointments, and trust the whole to nature? Those ulcers, which require the assistance of mercury bark, and a particular regimen, are unknown to the Indians.

The HEMORRHAGES which sometimes follow their wounds are restrained, by plunging themselves into cold water, and thereby producing a constriction upon the bleeding vessels.

Their practice of attempting to recover DROWNED PEOPLE is irrational and unsuccessful. It consists in suspending the patient by the heels, in order that the water may flow from his mouth. This practice is founded on a belief, that the patient dies from swallowing an excessive quantity of water. But modern observations teach us, that drowned people die from another cause. This discovery has suggested a method of cure, directly opposite to that in use among the Indians; and has shown us that the practice of suspending by the heels is hurtful.

I do not find that the Indians ever suffer in their limbs from the action of COLD upon them. Their mokasons,* by allowing their feet to move freely, and thereby promoting the circulation of the blood, defend their lower extremities in the daytime, and their practice of sleeping with their feet near a fire defends them from the morbid effects of cold at night. In those cases, where the motion of their feet in their mokasons is not sufficient to keep them warm, they break the ice, and restore their warmth, by exposing them for a short time to the action of cold water.†

We have heard much of their specific antidotes to the VENEREAL DISEASE. In the accounts of these anti-venereal medicines, some abatement should be made for that love of the marvellous, and of novelty, which are apt to creep into the writings of travellers and physicians. How many medicines, which were once thought infallible in this disease, are now rejected from the materia medica! I have found upon inquiry that the Indians always assist their medicines in this disease, by a regimen which promotes perspiration. Should we allow that mercury acts as a specific in destroying this disease, it does not follow that

* Indian shoes.

† It was remarked in Canada, in the winter of the year 1759, during the war before last, that none of those soldiers who wore mokasons were frost-bitten, while few of those escaped that were much exposed to the cold who wore shoes.

it is proof against the efficacy of medicines, which act more mechanically upon the body.*

There cannot be a stronger mark of the imperfect state of knowledge in medicine among the Indians, than their method of treating the SMALL-POX. We are told that they plunge themselves in cold water in the beginning of the disease, and that it often proves fatal to them.

Travellers speak in high terms of the Indian ANTIDOTES TO POISONS. We must remember that many things have been thought poisonous, which later experience hath proved to possess no unwholesome quality. Moreover, the uncertainty and variety, in the operation of poisons, renders it extremely difficult to fix the certainty of the antidotes to them. How many specifics have derived their credit for preventing the hydrophobia, from persons being wounded by animals, who were not in a situation to produce that disease! If we may judge of all the Indian antidotes to poisons, by those which have fallen into our hands, we have little reason to ascribe much to them in any cases whatever.

I have heard of their performing several remarkable cures upon STIFF JOINTS, by an infusion of certain herbs in water. The mixture of several herbs together in this infusion calls in question the specific efficacy of each of them. I cannot help attributing the whole success of this remedy to the great heat of the water in which the herbs were boiled, and to its being applied for a long time to the part affected. We find the same medicine to vary frequently in its success, according to its strength, or to the continuance of its application. De Haen attributes the good effects of electricity entirely to its being used for several months.

I have met with one case upon record, of their aiding nature in PARTURITION. Captain Carver gives us an account of an Indian woman in a difficult labour being suddenly delivered, in consequence of a general convulsion induced upon her system by stopping, for a short

* I cannot help suspecting the anti-venereal qualities of the lobelia, ceanthus and ranunculus, spoken of by Mr. Kalm, in the Memoirs of the Swedish Academy. Mr. Hand informed me, that the Indians rely chiefly upon a plentiful use of the decoctions of the pine-trees for the cure of the venereal disease. He added, moreover, that he had often known this disease prove fatal to them.

time, her mouth and nose, so as to obstruct her breathing.

We are sometimes amused with accounts of Indian remedies for the DROPSY, EPILEPSY, COLIC, GRAVEL, and GOUT. If, with all the advantages which modern physicians derive from their knowledge in anatomy, chemistry, botany, and philosophy ; if, with the benefit of discoveries communicated from abroad, as well as handed down from our ancestors, by more certain methods than tradition, we are still ignorant of certain remedies for these diseases ; what can we expect from the Indians, who are not only deprived of these advantages, but want our chief motive, the sense of the pain and danger of those diseases, to prompt them to seek for such remedies to relieve them ! There cannot be a stronger proof of their ignorance of proper remedies for new or difficult diseases, than their having recourse to enchantment. But to be more particular ; I have taken pains to inquire into the success of some of these Indian specifics, and have never heard of one well attested case of their efficacy. I believe they derive all their credit from our being ignorant of their composition. The influence of secrecy is well known in establishing the credit of a medicine. The *sal seignette* was supposed to be an infallible medicine for the intermitting fever, while the manufactory of it was confined to an apothecary at Rochelle ; but it lost its virtues, as soon as it was found to be composed of the acid of tartar and the fossil alkali. Dr. Ward's famous pill and drop ceased to do wonders in scrophulous cases, as soon as he bequeathed to the world his receipts for making them.

I foresee an objection to what has been said concerning the remedies of the Indians, drawn from that knowledge which experience gives to a mind intent upon one subject. We have heard much of the perfection of their senses of seeing and hearing. An Indian, we are told, will discover, not only a particular tribe of Indians by their footsteps, but the distance of time in which they were made. In those branches of knowledge which relate to hunting and war, the Indians have acquired a degree of perfection, that has not been equalled by civilized nations. But we must remember, that medicine among them does not possess the like advantages with the arts of war and hunting, of being the *chief* object of their attention. The physician and the

warrior are united in one character ; to render him as able in the former as he is in the latter profession would require an entire abstraction from every other employment, and a familiarity with external objects, which are incompatible with the wandering life of savages.

Thus have we finished our inquiry into the diseases and remedies of the Indians in North America. We come now to inquire into the diseases and remedies of civilized nations.

Nations differ in their degrees of civilization. We shall select one for the subject of our inquiries, which is most familiar to us ; I mean the British nation. Here we behold subordination and classes of mankind established, by government, commerce, manufactures and certain customs, common to most of the civilized nations of Europe. We shall trace the origin of their diseases through their customs, in the same manner as we did those of the Indians.

I. It will be sufficient to name the degrees of heat, the improper aliment, the tight dresses, and the premature studies, children are exposed to, in order to show the ample scope for diseases, which is added to the original defect of stamina they derive from their ancestors.

II. Civilization rises in its demands upon the health of women. Their fashions : their dress and diet ; their eager pursuits and ardent enjoyment of pleasure ; their indolence, and undue evacuations in pregnancy ; their cordials, hot regimen, and neglect, or use of art, in child-birth ; are all so many inlets to disease.

Humanity would vain be silent, while philosophy calls upon us to mention the effects of interested marriages, and of disappointments in love, increased by that concealment, which the tyranny of custom has imposed upon the sex.* Each of these exaggerates the natural and increases the number of artificial diseases among women.

III. The diseases introduced by civilization extend themselves through every class and profession among men. How fatal are the effects of idleness and intemperance among

* "Married women are more healthy and long-lived than single women. "The registers, examined by Mr. Muret, confirm this observation ; and "show, particularly, that of equal numbers of single and married women, "between fifteen and twenty-five years of age, more of the former died than "of the latter, in the proportion of two to one : the consequence, therefore, "of following nature must be favourable to health among the female sex." Supplement of Price's Observations on Reversionary Payments, p. 357.

the rich, and of hard labour and penury among the poor ! What pallid looks are contracted by the votaries of science. from hanging over the "sickly taper !" How many diseases are entailed upon manufacturers, by the materials in which they work, and the posture of their bodies ! What monkish diseases do we observe, from monkish continence and monkish vices ! We pass over the increase of accidents, from building, sailing, riding, and the like. War, as if too slow in destroying the human species, calls in a train of diseases peculiar to civilized nations. What havoc have the corruption and monopoly of provisions, a damp soil, and an unwholesome sky, made, in a few days, in an army ! The achievements of British valour, at the Havannah, in the last war, were obtained at the expense of 9,000 men, 7,000 of whom perished with the West India fever.* Even our modern discoveries in geography, by extending the empire of commerce, have likewise extended the empire of diseases. What desolation have the East and West Indies made of British subjects ! It has been found, upon a nice calculation, that only ten, of a hundred Europeans, live above seven years after they arrive in the island of Jamaica.

IV. It would take up too much of our time to point out all the customs, both *physical* and *moral*, which influence diseases among both sexes. The former have engendered the seeds of diseases in the human body itself ; hence the origin of catarrhs, jail and military fevers, with a long train of other diseases, which compose so great a part of our books of medicine. The latter likewise have a large share in producing diseases. I am not one of those modern philosophers, who derive the vices of mankind from the influence of civilization ; but I am safe in asserting, that their number and malignity increase with the refinements of polished life. To prove this, we need only sur-

* The modern writers upon the diseases of armies, wonder that the Greek and Roman physicians have left us nothing upon that subject. But may not *most* of the diseases of armies be produced by the different manner in which wars are carried on by the modern nations ? The discoveries in geography, by extending the field of war, expose soldiers to many diseases, from long voyages, and a *sudden* change of climate, which were unknown to the armies of former ages. Moreover, the form of the weapons, and the variety in the military exercises, of the Grecian and Roman armies gave a vigour to the constitution, which can never be acquired by the use of muskets and artillery.

vey a scene too familiar to affect us: it is a bedlam; which injustice, inhumanity, avarice, pride, vanity, and ambition, have filled with inhabitants.

Thus have I briefly pointed out the customs, which influence the diseases of civilized nations. It remains now that we take notice of their diseases. Without naming the many new fevers, fluxes, hemorrhages, swellings from water, wind, flesh, fat, pus, and blood; foulness on the skin, from cancers, leprosy, yaws, poxes, and itch; and, lastly, the gout, the hysteria, and the hypocondriasis, in all their variety of known and unknown shapes; I shall sum up all that is necessary upon this subject, by adding, that the number of diseases which belong to civilized nations, according to Doctor Cullen's nosology, amounts to 1387; the single class of nervous diseases form 612 of this number.

Before we proceed to speak of the remedies of civilized nations, we shall examine into the abilities of NATURE in curing their diseases. We found her active and successful in curing the diseases of the Indians. Are her strength, wisdom, or benignity equal to the increase of those dangers, which threaten her dissolution among civilized nations? In order to answer this question, it will be necessary to explain the meaning of the term nature.

By nature in the present case, I understand nothing but *physical necessity*. This at once excludes every thing like intelligence from her operations; these are all performed in obedience to the same laws, which govern vegetation in plants, and the intestine motions of fossils. They are as truly mechanical as the laws of gravitation, electricity, or magnetism. A ship, when laid on her broadside by a wave, or a sudden blast of wind, rises by the simple laws of her mechanism; but suppose this ship to be attacked by fire, or a water-spout, we are not to call in question the skill of the ship-builder, if she be consumed by the one, or sunk by the other. In like manner, the Author of nature hath furnished the body with powers to preserve itself from its natural enemies; but when it is attacked by those civil foes, which are bred by the peculiar customs of civilization, it resembles a company of Indians, armed with bows and arrows, against the complicated and deadly machinery of fire-arms. To place this subject in a proper

light, I shall deliver a history of the operations of nature in a few of the diseases of civilized nations.

I. There are cases, in which nature is still successful in curing diseases.

In fevers, she still deprives us of our appetite for animal food, and imparts to us a desire for cool air and cold water.

In hemorrhages, she produces a faintness, which occasions a coagulum in the open vessels; so that the further passage of blood through them is obstructed.

In wounds of the flesh and bones she discharges foreign matter, by exciting an inflammation, and supplies the waste of both with new flesh and bone.

II. There are cases where the efforts of nature are too feeble to do service, as in malignant and chronic fevers.

III. There are cases, where the efforts of nature are over-proportioned to the strength of the disease, as in the cholera morbus and dysentery.

IV. There are cases, where nature is idle, as in the atonic stages of the gout, the cancer, the epilepsy, the mania, the venereal disease, the apoplexy, and the tetanus.*

V. There are cases, in which nature does mischief. She wastes herself with an unnecessary fever in a dropsy and consumption. She throws a plethora upon the brain and lungs in the apoplexy and peripneumonia notha. She ends a pleurisy and peripneumony in a vomica, or empyema. She creates an unnatural appetite for food in the hypochondriac disease. And, lastly, she drives the melancholy patient to solitude, where, by brooding over the subject of his insanity, he increases his disease.

We are accustomed to hear of the salutary kindness of nature in alarming us with pain, to prompt us to seek for a remedy. But—

VI. There are causes in which she refuses to send this harbinger, of the evils which threaten her, as in the aneurism, scirrhus, and stone in the bladder.

VII. There are cases, where the pain is not proportioned to the danger, as in the tetanus, consumption, and dropsy in the head. And,

VIII. There are cases, where the pain is over-proportioned to the danger, as in the paronychia and tooth-ache.

This is a short account of the operations of nature in the

* Hoffman de hypothesium medicarum damno, sect. xv.

diseases of civilized nations. A lunatic might as well plead against the sequestration of his estate, because he once enjoyed the full exercise of his reason, or because he still had lucid intervals, as nature be exempted from the charges we have brought against her.

But this subject will receive strength from considering the REMEDIES of civilized nations. All the products of the vegetable, fossil, and animal kingdoms, tortured, by heat and mixture, into an almost infinite variety of forms; bleeding, cupping, artificial drains by setons, issues, and blisters; exercise, active and passive; voyages and journeys; baths warm and cold; waters saline, aërial, and mineral; food, by weight and measure; the royal touch; enchantment; miracles; in a word, the combined discoveries of natural history and philosophy united into a system of materia medica all show, that although physicians are in speculation the servants, yet in practice they are the masters, of nature. The whole of their remedies seem contrived on purpose to arouse, assist, restrain, and control her operations.

There are some truths, like certain liquors, which require strong heads to bear them. I feel myself protected from the prejudices of vulgar minds, when I reflect that I am delivering these sentiments in a society of philosophers.

Let us now take a COMPARATIVE VIEW of the diseases and remedies of the Indians with those of civilized nations. We shall begin with their diseases.

In our account of the diseases of the Indians we beheld death executing his commission, it is true; but then his dart was hid in a mantle, under which he concealed his shape. But among civilized nations we behold him multiplying his weapons, in proportion to the number of organs and functions in the body; and pointing each of them in such a manner, as to render his messengers more terrible than himself.

We said formerly that fevers constituted the chief diseases of the Indians. According to Doctor Sydenham's computation, above 66,000 out of 100,000 died of fevers, in London, about 100 years ago; but fevers now constitute but a little more than one-tenth part of the diseases of that city. Out of 21,780 persons who died in London, between December, 1770, and December, 1771, only

2273 died of simple fevers. I have more than once heard Doctor Huck complain, that he could find no marks of epidemic fevers in London, as described by Dr. Sydenham. London has undergone a revolution in its manners and customs since Doctor Sydenham's time. New diseases, the offspring of luxury, have supplanted fevers; and the few that are left are so complicated with other diseases, that their connection can no longer be discovered with an epidemic constitution of the year. The pleurisy and peripneumony, those inflammatory fevers of strong constitutions, are now lost in catarrhs, or colds, which, instead of challenging the powers of nature or art to a fair combat, insensibly undermine the constitution, and bring on an incurable consumption. Out of 22,434 who died in London, between December, 1769, and the same month in 1770, 4594 perished with that British disease. Our countryman, Doctor Maclurg, has ventured to foretel that the gout will be lost in a few years, in a train of hypochondriac, hysteric, and billious diseases. In like manner, may we not look for a season, when fevers, the natural diseases of the human body, will be lost in an inundation of artificial diseases, brought on by the modish practices of civilization?

It may not be improper to compare the PROGNOSIS of the Indians, in diseases, with that of civilized nations, before we take a comparative view of their remedies.

The Indians are said to be successful in predicting the events of diseases. While diseases are simple, the marks which distinguish them, or characterize their several stages, are generally uniform, and obvious to the most indifferent observer. These marks affords so much certainty, that the Indians sometimes kill their physicians for a false prognosis, charging the death of the patient to their carelessness, or ignorance. They estimate the danger of their patients by the degrees of appetite; while an Indian is able to eat, he is looked upon as free from danger. But when we consider the number and variety in the signs of diseases among civilized nations, together with the shortness of life, the fallacy of memory, and the uncertainty of observation, where shall we find a physician willing to risk his reputation, much less his life, upon the prediction of the event of our acute diseases? We can derive no advantage

from the simple sign, by which the Indians, estimate the danger of their patients; for we daily see a want of appetite for food in diseases which are attended with no danger; and we sometimes observe an unusual degree of this appetite to precede the agonies of death. I honour the name of HIPPOCRATES: but forgive me, ye votaries of antiquity, If I attempt to pluck a few gray hairs from his venerable head. I was once an idolater at his altar, nor did I turn apostate from his worship, till I was taught, that not a tenth part of his prognostics corresponded with modern experience, or observation. The pulse,* urine, and sweats, from which the principal signs of life and death have been taken, are so variable, in most of the acute diseases of civilized nations, that the wisest physicians have in some measure excluded the prognosis from being a part of their profession.

I am here insensibly led to make an apology for the instability of the theories and practice of physic. The theory of physic is founded upon the laws of the animal economy. These (unlike the laws of the mind, or the common laws of matter) do not appear at once, but are gradually brought to light by the phænomena of diseases. The success of nature in curing the simple diseases of Saxony laid the foundation for the ANIMA MEDICA of Doctor STAHL. The endemics of Holland† led Doctor BOERHAAVE to seek for the causes of all diseases in the FLUIDS. And the universal prevalence of diseases of the NERVES, in Great Britain, led Doctor CULLEN to discover their peculiar laws, and to found a system upon them; a system, which will probably last till some new diseases are let loose

* Doctor Cullen used to inform his pupils, that, after forty years' experience, he could find no relation between his own observations on the pulse, and those made by Doctor Solano. The climate and customs of the people in Spain being so different from the climate and customs of the present inhabitants of Britain may account for the diversity of their observations. Doctor Heberden's remarks upon the pulse, in the second volume of the Medical Transactions, are calculated to show how little the issue of diseases can be learned from it.

† "The scurvy is very frequent in Holland; and draws its origin partly from their strong food, sea-fish, and smoked flesh, and partly from their dense and moist air, together with their bad water." Hoffinan on Endemical Distempers.

"We are now in North Holland; and I have never seen, among so few people, so many infected with the leprosy as here. They say the reason is, because they eat so much fish." Howel's Familiar Letters.

upon the human species, which shall unfold other laws of the animal economy.

It is in consequence of this fluctuation in the principles and practice of physic being so necessarily connected with the changes in the customs of civilized nations, that old and young physicians so often disagree in their opinions and practices. And it is by attending to the constant changes in these customs of civilized nations, that those physicians have generally become the most eminent, who have soonest emancipated themselves from the tyranny of the schools of physic; and have occasionally accommodated their principles and practice to the changes in diseases.* This variety in diseases, which is produced by the changes in the customs of civilized nations, will enable us to account for many of the contradictions which are to be found in authors of equal candour and abilities, who have written upon the *materia medica*.

In forming a comparative view of the REMEDIES of the Indians, with those of civilized nations, we shall remark, that the want of success in a medicine is occasioned by one of the following causes :

First, our ignorance of the disease. Secondly, an ignorance of a suitable remedy. Thirdly, a want of efficacy in the remedy.

Considering the violence of the diseases of the Indians, it is probable their want of success is always occasioned by a want of efficacy in their medicines. But the case is very different among the civilized nations. Dissections daily convince us of our ignorance of the seats of diseases, and cause us to blush at our prescriptions. How often are we disappointed in our expectation from the most certain and powerful of our remedies, by the negligence or obstinacy of our patients! What mischief have we done under the belief of false facts (if I may be allowed the expression)

* We may learn, from these observations, the great impropriety of those Egyptian laws, which oblige physicians to adopt in all cases, the prescriptions which had been collected, and approved of, by the physicians of former ages. Every change in the customs of civilized nations produces a change in their diseases, which calls for a change in their remedies. What havoc, would plentiful bleeding, purging, and small beer, formerly used with so much success by Dr. Sydenham in the cure of fevers, now make upon the enfeebled citizens of London! The fevers of the same, and of more southern latitudes, still admit of such antiphlogistic remedies. In the room of these, bark, wine, and other cordial medicines, are prescribed in London in almost every kind of fever.

and false theories! We have assisted in multiplying diseases. We have done more—we have increased their mortality.

I shall not pause to beg pardon of the faculty, for acknowledging, in this public manner, the weaknesses of our profession. I am pursuing Truth, and while I can keep my eye fixed upon my guide, I am indifferent whither I am led, provided she is my leader.

But further, the Indian submits to his disease, without one fearful emotion from his doubtfulness of its event; and at last meets his fate, without an anxious wish for futurity: except it is of being admitted to an “equal sky,” where

“His faithful dog shall bear him company.”

But among civilized nations, the influence of a false religion in good, and of a true religion in bad men has converted even the fear of death into a disease. It is this original distemper of the imagination which renders the plague most fatal, upon its first appearance in a country.

Under all these disadvantages in the state of medicine, among civilized nations, do more in proportion die of the diseases peculiar to them, than of fevers, casualties, and old age, among the Indians? If we take our account from the city of London, we shall find this to be the case. Near a twentieth part of its inhabitants perish one year with another. Nor does the natural increase of inhabitants supply this yearly waste. If we judge from the bills of mortality, the city of London contains fewer inhabitants, by several thousands, than it did forty years ago. It appears from this fact, and many others of a like nature, which might be adduced, that although the difficulty of supporting children, together with some peculiar customs of the Indians, which we mentioned, limit their number, yet they multiply faster, and die in a smaller proportion, than civilized nations, under the circumstances we have described. The Indians, we are told, were numerous in this country, before the Europeans settled among them. Travellers agree likewise in describing numbers of both sexes, who exhibited all the marks of extreme old age. It is remarkable that age seldom impairs the faculties of their minds.

The mortality peculiar to those Indian tribes who have mingled with the white people must be ascribed to the extensive mischief of spirituous liquors. When these have not acted,

they have suffered from having accommodated themselves too suddenly to the European diet, dress and manners. It does not become us to pry too much into futurity ; but if we may judge from the fate of the original natives of Hispaniola, Jamaica, and the provinces on the continent, we may venture to foretel, that, in proportion as the white people multiply, the Indians will diminish ; so that in a few centuries they will probably be entirely exterminated.*

It may be said, that health among the Indians, like insensibility to cold and hunger, is proportionate to their need of it ; and that the less degrees or entire want of health, are no interruption to the ordinary business of civilized life.

To obviate this supposition, we shall first attend to the effects of a single disease in those people, who are the principal wheels in the machine of civil society. Justice has stopt its current, victories have been lost, wars have been prolonged and embassies delayed, by the principal actors in these departments of government being suddenly laid up by a fit of the gout. How many offences are daily committed against the rules of good breeding, by the tedious histories of our diseases, which compose so great a part of modern conversation ! What sums of money have been lavished in foreign countries in pursuit of health ! † Families have been ruined by the unavoidable expenses of medicines and watering-places. In a word, the swarms of beggars, which infest so many of the European countries, urge their petitions for charity chiefly by arguments deri-

* Even the influence of CHRISTIAN principles has not been able to put a stop to the mortality introduced among the Indians, by their intercourse with the Europeans. Dr. Cotton Mather, in a letter to sir William Ashurst, printed in Boston, in the year 1705, says, "that about five years before there were about thirty Indian congregations in the southern parts of the province of Massachusetts-Bay." The same author, in his history of New-England, says, "That in the islands of Nantucket and Martha's Vineyard there were 3000 *adult* Indians, 1600 of whom professed the Christian religion." At present there is but *one* Indian congregation in the whole Massachusetts province.

It may serve to extend our knowledge of diseases, to remark, that epidemics were often observed to prevail among the Indians in Nantucket without affecting the white people.

† It is said there are seldom less than 20,000 British subjects in France and Italy ; one half of whom reside or travel in those countries upon the account of their health.

ved from real or counterfeit diseases, which render them incapable of supporting themselves.*

But may not civilization, while it abates the violence of natural diseases, increase the lenity of those that are artificial, in the same manner that it lessens the strength of natural vices by multiplying them? To answer this question, it will only be necessary to ask another: Who would exchange the heat, thirst, and uneasiness of a fever for one fit of the colic or stone?

The history of the number, combination, and fashions of the remedies we have given, may serve to humble the pride of philosophy; and to convince us, that with all the advantages of the whole circle of sciences, we are still ignorant of antidotes to many of the diseases of civilized nations. We sometimes sooth our ignorance, by reproaching our idleness in not investigating the remedies peculiar to this country. We are taught to believe that every herb that grows in our woods is possessed of some medical virtue, and that heaven would be wanting in benignity, if our country did not produce remedies for all the different diseases of its inhabitants. It would be arrogating too much, to suppose that man was the only creature in our world for whom vegetables grow. The beasts, birds, and insects, derive their sustenance either directly or indirectly from them; while many of them were probably intended, from their variety in figure, foliage, and colour, only to serve as ornaments for our globe. It would seem strange that the Author of nature should furnish every spot of ground with medicines adapted to the diseases of its inhabitants, and at the same time deny it the more necessary articles of food and clothing. I know not whether Heaven has provided every country with antidotes even to the *natural* diseases of its inhabitants. The intermitting fever is common in almost every corner of the globe; but a sovereign remedy for it has been discovered only in South America. The combination of bitter and astringent substances which serve as a succedaneum to the Peruvian bark, is as much a preparation of art, as calomel or tarter

* Templeman computes, that Scotland contains 1,500,000 inhabitants; 100,000 of whom according to Mr. Fletcher, are supported at the public expense. The proportion of poor people is much greater in England, Ireland, France, and Italy.

emetic. Societies stand in need of each other as much as individuals; and the goodness of the Deity remains unimpeached, when we suppose that he intended medicines to serve (with other articles) to promote that knowledge, humanity and politeness, among the inhabitants of the earth, which have been so justly attributed to commerce.

We have no discoveries in the *materia medica* to hope for, from the Indians of North America. It would be a reproach to our schools of physic, if modern physicians were not more successful than the Indians, even in the treatment of their own diseases.

Do the blessings of civilization compensate for the sacrifice we make of natural health, as well as of natural liberty? This question must be answered under some limitations. When natural liberty is given up for laws which enslave instead of protecting us, we are immense losers by the exchange. Thus, if we arm the whole elements against our health, and render every pore in the body an avenue for a disease, we pay too high a price for the blessings of civilization.

In governments which have departed entirely from their simplicity, partial evils are to be cured by nothing but an entire renovation of their constitution. Let the world bear with the professions of law, physic, and divinity; and let the lawyer, physician, and divine, yet learn to bear with each other. They are all necessary, in the present state of society. In like manner, let the woman of fashion forget the delicacy of her sex, and submit to be delivered by a man-midwife.* Let her snatch her offspring from her breast, and send it to repair the weakness of its stamina, with the milk of a ruddy cottager† Let art supply the

* In the enervated age of Athens a law was passed, which confined the practice of midwifery only to the men. It was, however, repealed, upon a woman's dying in child-birth, rather than be delivered by a man-midwife. It appears from the bills of mortality in London and Dublin, that about one in seventy of those women die in child-birth, who are in the hands of midwives; but from the accounts of the lying-in hospitals in those cities, which are under the care of man-midwives, only one in a hundred and forty perishes in child-birth.

† There has been much common-place declamation against the custom among the great, of not suckling their children. Nurses were common in Rome, in the declension of the empire: hence we find Cornelia commended as a rare example of maternal virtue, as much for suckling her sons, as for teaching them eloquence. That nurses were common in Egypt, is probable from the contract which Pharaoh's daughter made with the unknown mother of Moses, to allow her wages for suckling her own child.

place of nature in the preparation and digestion of all our aliment. Let our fine ladies keep up their colour with carmine, and their spirits with ratifia: and let our fine gentlemen defend themselves from the excesses of heat and cold with lavender and hartshorn. These customs have become necessary in the corrupt stages of society. We must imitate, in these cases, the practice of those physicians, who consult the appetite only in diseases which do not admit of a remedy.

The state of a country, in point of population, temperance, and industry, is so connected with its diseases, that a tolerable idea may be formed of it, by looking over its bills of mortality. HOSPITALS, with all their boasted advantages, exhibit at the same time monuments of the charity, and depravity of a people.* The opulence of physicians, and the divisions of their offices, into those of surgery, pharmacy, and midwifery, are likewise proofs of the declining state of a country. In the infancy of the Roman empire, the priest performed the office of a physician; so simple were the principles and practice of physic. It was only in the declension of the empire, that physicians vied

The same degrees of civilization require the same customs. A woman whose times for eating and sleeping are constantly interrupted by the calls of enervating pleasures, must always afford milk of an unwholesome nature. It may truly be said of a child doomed to live on this aliment, that, as soon as it receive its

———"breath,
It sucks in "the lurking principles of death."

* "Aurengezebe, emperor of Persia, being asked, Why he did not build hospitals? said, *I will make my empire so rich, that there shall be no need of hospitals.* He ought to have said, I will begin by rendering my subjects rich, and then I will build hospitals.

"At Rome, the hospitals place every one at his ease, except those who labour, those who are industrious, those who have lands, and those who are engaged in trade.

"I have observed, that wealthy nations have need of hospitals, because fortune subjects them to a thousand accidents; but it is plain, that transient assistances are better than perpetual foundations. The evil is momentary; it is necessary, therefore, that the succour should be of the same nature, and that it be applied to particular accidents." Spirit of Laws, b. xxiii. ch. 29.

It was reserved for the present generation to substitute in the room of public hospitals private DISPENSARIES for the relief of the sick. Philosophy and Christianity alike concur in deriving praise and benefit from these excellent institutions. They exhibit something like an application of the mechanical powers to the purposes of benevolence; for in what other charitable institutions do we perceive so great a *quantity* of distress relieved by so small an expense?

with the emperors of Rome in magnificence and splendour.*

I am sorry to add, in this place, that the number of patients in the HOSPITAL, and incurables in the ALMSHOUSE of this city, show that we are treading in the enervated steps of our fellow subjects in Britain. Our bills of mortality likewise show the encroachments of British diseases upon us. The NERVOUS FEVER has become so familiar to us, that we look upon it as a natural disease. Dr. Sydenham, so faithful in his history of fevers, takes no notice of it. Dr. Cadwallader informed me, that it made its first appearance in this city about five and twenty years ago. It will be impossible to name the CONSUMPTION, without recalling to our minds the memory of some friend or relation, who has perished within these few years by that disease. Its rapid progress among us has been unjustly attributed to the growing resemblance of our climate to that of Great Britain. The HYSTERIC and HYPOCHONDRIAC DISEASES, once peculiar to the chambers of the great, are now to be found in our kitchens and workshops. All these diseases have been produced by our having deserted the simple diet and manners of our ancestors.

The blessings of literature, commerce, and religion, were not *originally* purchased at the expense of health. The complete enjoyment of health is as compatible with civilization, as the enjoyment of civil liberty. We read of countries, rich in every thing that can form national happiness and national grandeur, the diseases of which are nearly as few and simple as those of the Indians. We hear of no diseases among the Jews, while they were under their democratical form of government, except such as were

* The first regular practitioners of physic in Rome were women and slaves. The profession was confined to them above six hundred years. The Romans, during this period, lived chiefly upon vegetables, particularly upon PULSE; and hence they were called, by their neighbours, PULTIFAGI. They were likewise early inured to the healthy employments of war and husbandry. Their diseases, of course, were too few and simple, to render the cure of them an object of liberal profession. When their diseases became more numerous and complicated, their investigation and cure required the aids of philosophy. The profession from this time became liberal; and maintained a rank with the other professions which are founded upon the imperfection and depravity of human institutions. Physicians are as necessary in the advanced stages of society as surgeons, although their office is less ancient and certain. There are many artificial diseases, in which they give certain relief; and even where their art fails, their prescriptions are still necessary, in order to smoothe the avenues of death.

inflicted by a supernatural power.* We should be tempted to doubt the accounts given of the populousness of that people, did we not see the practice of their simple customs producing nearly the same populousness in Egypt, Rome, and other countries of antiquity. The empire of China, it is said, contains more inhabitants than the whole of Europe. The political institutions of that country have exempted its inhabitants from a large share of the diseases of other civilized nations. The inhabitants of Switzerland, Denmark, Norway,† and Sweden, enjoy the chief advantages of civilization, without having surrendered for them the blessings of natural health. But it is unnecessary to appeal to ancient or remote nations, to prove that health is not incompatible with civilization. The inhabitants of many parts of New England, particularly of the province of Connecticut, are but little effected by artificial diseases. Some of you may remember the time, and our fathers have told those of us who do not, when the diseases of PENNSYLVANIA were as few and as simple as those of the Indians. The food of the inhabitants was then simple; their only drink was water; their appetites were restrained by labour; religion excluded the influence of sickening passions; private hospitality supplied the want of a public hospital; nature was their only nurse, and temperance their principal physician.

* The principal employments of the Jews, like those of the Romans in their simple ages, consisted in war and husbandry. Their diet was plain, consisting chiefly of vegetables. Their only remedies were plaisters and ointments; which were calculated for those diseases which are produced by accidents. In proportion as they receded from their simple customs, we find artificial diseases prevail among them. The leprosy made its appearance in their journey through the wilderness. King Asa's pains in his feet were probably brought on by a fit of the gout. Saul and Nebuchadnezzar were afflicted with a melancholy. In the time of our Saviour, we find an account of all those diseases in Judea which mark the declension of a people; such as, the palsy, epilepsy, mania, blindness, hemorrhagia, uterina, &c. It is unnecessary to suppose that they were let loose at this juncture, on purpose to give our Saviour an opportunity of making them the chief subject of his miracles. They had been produced from natural causes, by the gradual depravity of their manners. It is remarkable, that our Saviour choose those artificial diseases for the subject of his miracles, in preference to natural diseases. The efforts of nature, and the operations of medicines, are too slow and uncertain in these cases to detract in the least from the validity of the miracle. He cured Peter's mother-in-law, it is true, of a fever; but to show that the cure was miraculous, the sacred historian adds (contrary to what is common after a fever) "that she arose *immediately*, and ministered unto them."

† In the city of Bergen, which consists of 30,000 inhabitants, there is but one physician: who is supported at the expense of the public. Pontoppidan's Nat. Hist. of Norway.

But I must not dwell upon this retrospect of primeval manners; and I am too strongly impressed with a hope of a revival of such happy days, to pronounce them the golden age of our province.

Our esteem for the customs of our savage neighbours will be lessened, when we add, that civilization does not preclude the honours of old age. The proportion of old people is much greater among civilized, than among savage nations. It would be easy to decide this assertion in our favour, by appealing to facts in the natural histories of Britain, Norway, Sweden, North America,* and several of the West India islands.

The laws of decency and nature are not necessarily abolished by the customs of civilized nations. In many of these we read of women, among whom nature alone still performs the office of a midwife,† and who feel the obligations of suckling their children to be equally binding with the common obligations of morality.

Civilization does not render us less fit for the necessary hardships of war. We read of armies of civilized nations, who have endured degrees of cold, hunger, and fatigue, which have not been exceeded by the savages of any country.‡

* It has been urged against the state of longevity in America, that the Europeans, who settle among us, generally arrive to a greater age than the Americans. This is not occasioned so much by a peculiar firmness in their stamina, as by an increase of vigour which the constitution acquires by a change of climate. A Frenchman (*cæteris paribus*) outlives an Englishman in England. A Hollander prolongs his life by removing to the Cape of Good Hope. A Portuguese gains fifteen or twenty years by removing to Brazil. And there are good reasons to believe that a North American would derive the same advantages, in point of health and longevity, by removing to Europe, which a European derives from coming to this country.

From a calculation made by an ingenious foreigner, it appears, that a greater proportion of old people are to be found in Connecticut, than in any colony in North America. This colony contains 180,000 inhabitants. They have no public hospitals or poor-houses; nor is a beggar to be seen among them. There cannot be more striking proofs than these facts of the simplicity of their manners.

† Parturition, in the simple ages of all countries, is performed by nature. The Israelitish women were delivered even without the help of the Egyptian midwives. We read of but two women who died in child-birth, in the whole history of the Jews. Dr. Bancroft says, that child-bearing is attended with so little pain in Guiana, that the women seem to be exempted from the curse inflicted upon Eve. These easy births are not confined to warm climates. They are equally safe and easy in Norway and Iceland, according to Pontoppidan and Anderson's histories of those countries.

‡ Civilized nations have, in the end, always conquered savages as much by their ability to bear hardships, as by their superior military skill. Sol-

Civilization does not always multiply the avenues of death. It appears from the bills of mortality of many countries, that fewer in proportion die among civilized, than among savage nations.

Even the charms of beauty are heightened by civilization. We read of stateliness, proportion, fine teeth,* and complexions, in both sexes, forming the principal outlines of national characters.

The danger of many diseases is not proportioned to their violence, but to their duration. America has advanced but a few paces in luxury and effeminacy. There is yet strength enough in her vitals to give life to those parts which are decayed. She may tread back her steps. For this purpose—

I. Let our children be educated in a manner more agreeable to nature.

II. Let the common people (who constitute the wealth and strength of our country) be preserved from the effects of ardent spirits. Had I a double portion of all that eloquence, which has been employed in describing the political evils that lately threatened our country, it would be too little to set forth the numerous and complicated *physical* and *moral* evils, which these liquors have introduced among us. To encounter this *hydra* requires an arm accustomed, like that of Hercules, to vanquish monsters. Sir William Temple tells us, that formerly in Spain no man could be admitted as an evidence in a court, who had once been convicted of drunkenness. I do not call for so severe a law in this country. Let us first try the force of severe man-

diers are not to be chosen indiscriminately. The greatest generals have looked upon sound constitutions to be as essential to soldiers, as bravery or military discipline. Count Saxe refused soldiers born and bred in large cities; and sought for such only as were bred in mountainous countries. The king of Prussia calls young soldiers only to the dangers and honours of the field, in his elegant poem, *Sur l'Art de la Guerre*, chant 1. Old soldiers generally lose the advantages of their veteranism, by their habits of idleness and debauchery. An able general, and experienced officers, will always supply the defects of age in young soldiers.

* Bad teeth are observed chiefly in middle latitudes, which are subject to alternate heats and colds. The inhabitants of Norway and Russia are as remarkable for their fine teeth as the inhabitants of Africa. We observe fine teeth to be universal likewise among the inhabitants of France, who live in a *variable* climate. These have been ascribed to their protecting their heads from the action of the night air by means of woollen night-caps, and to the extraordinary attention to the teeth of their children. These precautions secure good teeth; and are absolutely necessary in all variable climates, where people do not adopt all the customs of the savage life.

ners. Lycurgus governed more by these, than by his laws. "Boni mores, non bonæ leges," according to Tacitus, were the bulwarks of virtue among the ancient Germans.

III. I despair of being able to call the votaries of Bacchus from their bottle, and shall therefore leave them to be roused by the more eloquent twinges of the gout.

IV. Let us be cautious what kind of manufactures we admit among us. The rickets made their first appearance in the manufacturing towns in England. Dr. Fothergill informed me, that he had often observed, when a pupil, that the greatest part of the chronic patients in the London Hospital were Spittal-field weavers. I would not be understood, from these facts, to discourage those manufactures which employ women and children: these suffer few inconveniences from a sedentary life; nor do I mean to offer the least restraint to those manufactories among men, which admit of free air, and the exercise of all their limbs. Perhaps a pure air, and the abstraction of spirituous liquors, might render sedentary employments less unhealthy in America, even among men, than in the populous towns of Great Britain.

The population of a country is not to be accomplished by rewards and punishments. And it is happy for America, that the universal prevalence of the protestant religion, the checks lately given to negro slavery, the general unwillingness among us to acknowledge the usurpations of primogeniture, the universal practice of inoculation for the small-pox, and the absence of the plague, render the interposition of government for that purpose unnecessary.

These advantages can only be secured to our country by AGRICULTURE. This is the true basis of national health, riches, and populousness. Nations, like individuals, never rise higher than when they are ignorant whither they are tending. It is impossible to tell, from history, what will be the effects of agriculture, industry, temperance, and commerce, urged on by the competition of colonies united in the same general pursuits, in a country, which for extent, variety of soil, climate, and number of navigable rivers, has never been equalled in any quarter of the globe. America is the theatre, where human nature will probably receive her last and principal literary, moral, and political honours.

But I recall myself from the ages of futurity. The province of Pennsylvania has already shown, to her sister colonies, the influence of agriculture and commerce upon the number and happiness of a people. It is scarcely a hundred years since our illustrious legislator, with a handful of men, landed upon these shores. Although the perfection of our government, the healthiness of our climate, and the fertility of our soil, seemed to ensure a rapid settlement of the province; yet it would have required a prescience bordering upon divine to have foretold, that in such a short space of time the province would contain above 300,000 inhabitants; and that nearly 30,000 of this number should compose a city, which should be the third, if not the second, in commerce in the British empire. The pursuits of literature require leasure, and a total recess from clearing forests, planting, building, and all the common toils of settling a new country; but before these arduous works were accomplished, the SCIENCES, ever fond of the company of liberty and industry, chose this spot for the seat of their empire in this new world. Our COLLEGE, so catholic in its foundation, and extensive in its objects, already sees her sons executing offices in the highest departments of society. I have now the honour of speaking in the presence of a most respectable number of philosophers, physicians, astronomers, botanists, patriots, and legislators; many of whom have already seized the prizes of honour, which their ancestors had allotted to a much later posterity. Our first offering had scarcely found its way into the temple of fame, when the oldest societies in Europe turned their eyes upon us, expecting with impatience to see the mighty fabric of science, which, like a well-built arch, can only rest upon the whole of its materials, completely finished from the treasures of this unexplored quarter of the globe.

It reflects equal honour upon our society and the honourable assembly of our province, to acknowledge, that we have always found the latter willing to encourage by their patronage, and reward by their liberality, all our schemes for promoting useful knowledge. What may we not expect from this harmony between the sciences and government! Methinks I see canals cut, rivers once im-

passable rendered navigable, bridges erected, and roads improved, to facilitate the exportation of grain. I see the banks of our rivers vieing in fruitfulness with the banks of the river of Egypt. I behold our farmers nobles ; our merchants princes. But I forbear—imagination cannot swell with the subject.

I beg leave to conclude, by deriving an argument from our connection with the legislature, to remind my auditors of the duty they owe to the society. Patriotism and literature are here connected together ; and a man cannot neglect the one, without being destitute of the other. Nature and our ancestors have completed their works among us ; and have left us nothing to do, but to enlarge and perpetuate our own happiness.

AN INQUIRY

INTO THE

INFLUENCE OF PHYSICAL CAUSES

UPON

THE MORAL FACULTY.

DELIVERED BEFORE THE AMERICAN PHILOSOPHICAL SOCIETY, HELD AT PHILADELPHIA,
ON THE TWENTY-SEVENTH OF FEBRUARY, 1786.

AN INQUIRY, &c.

GENTLEMEN,

IT was for the laudible purpose of exciting a spirit of emulation and inquiry among the members of our body, that the founders of our society instituted an annual oration. The task of preparing, and delivering this exercise, hath devolved, once more, upon me. I have submitted to it, not because I thought myself capable of fulfilling your intentions, but because I wished, by a testimony of my obedience to your requests, to atone for my long absence from the temple of science.

The subject, upon which I am to have the honour of addressing you this evening, is on the influence of physical causes upon the moral faculty.

By the moral faculty I mean a capacity in the human mind of distinguishing and choosing good and evil, or, in other words, virtue and vice. It is a native principle, and though it be capable of improvement by experience and reflection, it is not derived from either of them. St. Paul and Cicero give us the most perfect account of it that is to be found in modern or ancient authors. "For when the Gentiles (says St. Paul) which have not the law, do by nature the things contained in the law, *these*, having not the law, are a *law* unto themselves; which show the works of the law written in their hearts, their consciences also, bearing witness, and their thoughts the mean while accusing, or else excusing, another."*

The words of Cicero are as follow: "Est igitur hæc, judices, non scripta, sed nata lex, quam non didicimus, accepimus, legimus, verum ex natura ipsa arripimus,

* Rom. i. 14, 15:

hausinus, exprèssimus, ad quam non docti, sed facti, non instituti, sed imbuti sumus.”* This faculty is often confounded with conscience, which is a distinct and independent capacity of the mind. This is evident from the passage quoted from the writings of St. Paul, in which conscience is said to be the witness that accuses or excuses us, of a breach of the law written in our hearts. The moral faculty is what the schoolmen call the “regula regulans;” the conscience is their “regula regulata;” or, to speak in more modern terms, the moral faculty performs the office of a law-giver, while the business of conscience is to perform the duty of a judge. The moral faculty is to the conscience, what taste is to the judgment, and sensation to perception. It is quick in its operations, and, like the sensitive plant, acts without reflection, while conscience follows with deliberate steps, and measures all her actions by the unerring square of right and wrong. The moral faculty exercises itself upon the actions of others. It approves, even in books, of the virtues of a Trajan, and disapproves of the vices of a Marius, while conscience confines its operations only to its own actions. These two capacities of the mind are generally in an exact ratio to each other, but they sometimes exist in different degrees in the same person. Hence we often find conscience in its full vigour, with a diminished tone, or total absence of moral faculty.

It has long been a question among metaphysicians, whether the conscience be seated in the will or in the understanding. The controversy can only be settled by admitting the will to be the seat of the moral faculty, and the understanding to be the seat of the conscience. The mysterious nature of the union of those two moral principles with the will and understanding is a subject foreign to the business of the present inquiry.

As I consider virtue and vice to consist in *action*, and not in opinion, and as this action has its seat in the *will*, and not in the conscience, I shall confine my inquiries chiefly to the influence of physical causes upon that moral power of the mind, which is connected with volition, although many of these causes act likewise upon the con-

* Oratio pro Milone.

science, as I shall show hereafter. The state of the moral faculty is visible in actions, which affect the well being of society. The state of the conscience is invisible, and therefore removed beyond our investigation.

The moral faculty has received different names from different authors. It is the "moral sense" of Dr. Hutcheson; "the sympathy" of Dr. Adam Smith; the "moral instinct" of Rousseau; and "the light that lighteth every man that cometh into the world" of St. John. I have adopted the term of moral faculty from Dr. Beattie, because I conceive it conveys, with the most perspicuity, the idea of a capacity in the mind of choosing good and evil.

Our books of medicine contain many records of the effects of physical causes upon the memory, the imagination, and the judgment. In some instances we behold their operation only on one, in others on two, and, in many cases, upon the whole of these faculties. Their derangement has received different names, according to the number or nature of the faculties that are affected. The loss of memory has been called "amnesia;" false judgment upon one subject has been called "melancholia;" false judgment upon all subjects has been called "mania;" and a defect of all the three intellectual faculties that have been mentioned has received the name of "amentia." Persons who labour under the derangement, or want of these faculties of the mind, are considered very properly, as subjects of medicine; and there are many cases upon record, that prove that their diseases have yielded to the healing art.

In order to illustrate the effects of physical causes upon the moral faculty, it will be necessary *first* to show their effects upon the memory, the imagination, and the judgment; and at the same time to point out the analogy between their operation upon the intellectual faculties of the mind and the moral faculty.

1. Do we observe a connection between the intellectual faculties and the degrees of consistency and firmness of the brain in infancy and childhood? the same connection has been observed between the strength, as well as the progress, of the moral faculty in children.

2. Do we observe a certain size of the brain, and a peculiar cast of features, such as the prominent eye, and the aquiline nose, to be connected with extraordinary portions of genius? We observe a similar connection between the figure and temperament of the body and certain moral qualities. Hence we often ascribe good temper and benevolence to corpulency, and irascibility to sanguineous habits. Cæsar thought himself safe in the friendship of the "sleek-headed" Anthony and Dolabella, but was afraid to trust to the professions of the slender Cassius.

3. Do we observe certain degrees of the intellectual faculties to be hereditary in certain families? The same observation has been frequently extended to moral qualities. Hence we often find certain virtues and vices as peculiar to families, through all their degrees of consanguinity and duration, as a peculiarity of voice, complexion, or shape.

4. Do we observe instances of a total want of memory, imagination, and judgment, either from an original defect in the stamina of the brain, or from the influence of physical causes? The same unnatural defect is sometimes observed, and probably from the same causes, of a moral faculty. The celebrated Servin, whose character is drawn by the duke of Sully, in his memoirs, appears to be an instance of the total absence of the moral faculty, while the chasm, produced by this defect, seems to have been filled up by a more than common extension of every other power of his mind. I beg leave to repeat the history of this prodigy of vice and knowledge. "Let the reader represent to himself a man of a genius so lively, and of an understanding so extensive, as rendered him scarce ignorant of any thing that could be known: of so vast and ready a comprehension, that he immediately made himself master of whatever he attempted; and of so prodigious a memory, that he never forgot what he once learned. He possessed all parts of philosophy, and the mathematics, particularly fortification and drawing. Even in theology he was so well skilled, that he was an excellent preacher, whenever he had a mind to exert that talent, and an able disputant for and against the reformed religion, indifferently. He not only understood Greek, Hebrew, and all

the languages which we call learned, but also all the different jargons, or modern dialects. He accented and pronounced them so naturally, and so perfectly imitated the gestures and manners both of the several nations of Europe, and the particular provinces of France, that he might have been taken for a native of all, or any, of these countries: and this quality he applied to counterfeit all sorts of persons, wherein he succeeded wonderfully. He was, moreover, the best comedian, and the greatest droll that perhaps ever appeared. He had a genius for poetry, and had wrote many verses. He played upon almost all instruments, was a perfect master of music, and sang most agreeably and justly. He likewise could say mass, for he was of a disposition to do, as well as to know, all things. His body was perfectly well suited to his mind. He was light, nimble, and dexterous, and fit for all exercises. He could ride well, and in dancing, wrestling, and leaping, he was admired. There are not any recreative games that he did not know, and he was skilled in almost all mechanic arts. But now for the reverse of the medal. Here it appeared, that he was treacherous, cruel, cowardly, deceitful, a liar, a cheat, a drunkard, and a glutton, a sharper in play, immersed in every species of vice, a blasphemer, an atheist. In a word, in him might be found all the vices that are contrary to nature, honour, religion and society, the truth of which he himself evinced with his latest breath; for he died in the flower of his age, in a common brothel, perfectly corrupted by his debaucheries, and expired with the glass in his hand, cursing and denying God.”*

It was probably a state of the human mind such as has been described, that our Saviour alluded to in the disciple who was about to betray him, when he called him “a devil.” Perhaps the essence of depravity, in infernal spirits, consists in their being wholly devoid of a moral faculty. In them the will has probably lost the power of choosing,† as well as the capacity of enjoying, moral good.

* Vol. iii. p. 216, 217.

† Milton seems to have been of this opinion. Hence, after ascribing repentance to Satan, he makes him declare,

“Farewell remorse: all good to me is lost,

“*Evil, be thou my good.*”————

PARADISE LOST, Book IV.

It is true, we read of their trembling in a belief of the existence of a God, and of their anticipating future punishment, by asking whether they were to be tormented before their time : but this is the effect of conscience, and hence arises another argument in favour of this judicial power of the mind being distinct from the moral faculty. It would seem as if the Supreme Being had preserved the moral faculty in man from the ruins of his fall on purpose to guide him back again to Paradise, and at the same time had constituted the conscience, both in men and fallen spirits, a kind of royalty in his moral empire, on purpose to show his property in all intelligent creatures, and their original resemblance to himself. Perhaps the essence of moral depravity in man consists in a total, but temporary, suspension of the power of conscience. Persons in this situation are emphatically said in the scriptures to "be past feeling," and to have their consciences seared with a "hot iron;" they are likewise said to be "twice dead," that is, the same torpor, or moral insensibility, has seized both the moral faculty and the conscience.

5. Do we ever observe instances of the existence of only *one* of the three intellectual powers of the mind that have been named, in the absence of the other two? We observe something of the same kind with respect to the moral faculty. I once knew a man, who discovered no one mark of reason, who possessed the moral sense or faculty in so high a degree, that he spent his whole life in acts of benevolence. He was not only inoffensive (which is not always the case with idiots) but he was kind and affectionate to every body. He had no ideas of time, but what were suggested to him by the returns of the stated periods for public worship, in which he appeared to take great delight. He spent several hours of every day in devotion, in which he was so careful to be private, that he was once found in the most improbable place in the world for that purpose, viz. in an oven.

6. Do we observe the memory, the imagination, and the judgment, to be affected by diseases, particularly by madness? Where is the physician, who has not seen the moral faculty affected from the same causes! How often

do we see the temper wholly changed by a fit of sickness! And how often do we hear persons of the most delicate virtue utter speeches, in the delirium of a fever, that are offensive to decency or good manners! I have heard a well-attested history of a clergyman of the most exemplary moral character, who spent the last moments of a fever, which deprived him both of his reason and his life, in profane cursing and swearing. I once attended a young woman in a nervous fever, who discovered, after her recovery a loss of her former habit of veracity. Her memory (a defect of which might be suspected of being the cause of this vice) was in every respect as perfect as it was before the attack of the fever.* The instances of immorality in maniacs, who were formerly distinguished for the opposite character, are so numerous, and well known, that it will not be necessary to select any cases, to establish the truth of the proposition contained under this head.

7. Do we observe any of the three intellectual faculties that have been named enlarged by diseases? Patients, in the delirium of a fever, often discover extraordinary flights of imagination, and madmen often astonish us with their wonderful acts of memory. The same enlargement, sometimes, appears in the operations of the moral faculty. I have more than once heard the most sublime discourses of morality in the cell of a hospital; and who has not seen instances of patients in acute diseases discovering degrees of benevolence and integrity, that were not natural to them in the ordinary course of their lives?†

8. Do we ever observe a partial insanity, or false perception on one subject, while the judgment is sound and correct, upon all others? we perceive, in some instances, a similar defect in the moral faculty. There are persons who are moral, in the highest degree, as to certain duties, who nevertheless live under the influence of some one vice. I knew an instance of a woman, who was exem-

* I have selected this case from many others which have come under my notice, in which the moral faculty appeared to be impaired by diseases, particularly by the typhus of Dr. Cullen, and by those species of palsy which affect the brain.

† Xenophon makes Cyrus declare, in his last moments, "That the soul of man, at the hour of death, appears *most divine*, and then foresees something of future events."

plary in her obedience to every command of the moral law, except one. She could not refrain from stealing. What made this vice the more remarkable was, that she was in easy circumstances, and not addicted to extravagance in any thing. Such was her propensity to this vice, that when she could lay her hands upon nothing more valuable, she would often at the table of a friend, fill her pockets secretly with bread. As a proof that her judgment was not affected by this defect in her moral faculty, she would both confess and lament her crime, when detected in it.

9. Do we observe the imagination in many instances to be affected with apprehensions of dangers that have no existence? In like manner we observe the moral faculty to discover a sensibility to vice, that is by no means proportioned to its degrees of depravity. How often do we see persons labouring under this morbid sensibility of the moral faculty refuse to give a direct answer to a plain question; that related perhaps only to the weather, or to the hour of the day, lest they should wound the peace of their minds by telling a falsehood!

10. Do dreams affect the memory, the imagination, and the judgment? Dreams are nothing but incoherent ideas, occasioned by partial or imperfect sleep. There is a variety in the suspension of the faculties and operations of the mind in this state of the system. In some cases the imagination only is deranged in dreams, in others, the memory is affected, and in others the judgment. But there are cases, in which the change that is produced in the state of the brain, by means of sleep, affects the moral faculty likewise; hence we sometimes dream of doing and saying things, when asleep, which we shudder at as soon as we awake. This supposed defection from virtue exists frequently in dreams, where the memory and judgment are scarcely impaired. It cannot therefore be ascribed to an absence of the exercises of those two powers of the mind.

11. Do we read, in the accounts of travellers, of men, who, in respect of intellectual capacity and enjoyments, are but a few degrees above brutes? We read likewise of a similar degradation of our species, in respect to moral

capacity and feeling. Here it will be necessary to remark, that the low degrees of moral perception, that have been discovered in certain African and Russian tribes of men, no more invalidate our proposition of the universal and essential existence of a moral faculty in the human mind, than the low state of their intellects prove, that reason is not natural to man. Their perceptions of good and evil are in an exact proportion to their intellectual faculties. But I will go further, and admit, with Mr. Locke,* that some savage nations are totally devoid of the moral faculty, yet it will by no means follow, that this was the original constitution of their minds. The appetite for certain aliments is uniform among all mankind. Where is the nation and the individual, in their primitive state of health, to whom bread is not agreeable? But if we should find savages, or individuals, whose stomachs have been so disordered by intemperance as to refuse this simple and wholesome article of diet, shall we assert that this was the original, constitution of their appetites? By no means. As well might we assert, because savages destroy their beauty by painting and cutting their faces, that the principles of taste do not exist naturally in the human mind. It is with virtue as with fire. It exists in the mind, as fire does in certain bodies, in a latent or quiescent state. As collision renders the one sensible, so education renders the other visible. It would be as absurd to maintain, because olives become agreeable to many people from habit, that we have no natural appetites for any other kind of food, as to assert that any part of the human species exist without a moral principle, because in some of them it has wanted causes to excite it into action, or has been perverted by example. There are appetites that are wholly artificial. There are tastes so entirely vitiated, as to perceive beauty in deformity. There are torpid and unnatural passions. Why, under certain unfavourable circumstances, may there not exist also a moral faculty, in a state of sleep, or subject to mistakes?

The only apology I shall make, for presuming to differ from that justly celebrated oracle,† who first unfolded to

* Essay concerning the Human Understanding, book I. chap. 3.

† Mr. Locke.

us a map of the intellectual world, shall be, that the eagle eye of genius often darts its views beyond the notice of facts, which are accommodated to the slender organs of perception of men, who possess no other talent than that of observation.

It is not surprising, that Mr. Locke has confounded this moral principle with *reason*, or that lord Shaftsbury has confounded it with *taste*, since all three of these faculties agree in the objects of their approbation, notwithstanding they exist in the mind independently of each other. The favourable influence, which the progress of science and taste has had upon the morals, can be ascribed to nothing else, but to the perfect union that subsists in nature between the dictates of reason, of taste, and of the moral faculty. Why has the spirit of humanity made such rapid progress for some years past in the courts of Europe? It is because kings and their ministers have been taught to *reason* upon philosophical subjects. Why have indecency and profanity been banished from the stage in London and Paris? It is because immorality is an offence against the highly cultivated *taste* of the French and English nations.

It must afford great pleasure to the lovers of virtue, to behold the depth and extent of this moral principle in the human mind. Happily for the human race, the intimations of duty and the road to happiness are not left to the slow operations or doubtful inductions of reason, nor to the precarious decisions of taste. Hence we often find the moral faculty in a state of vigour in persons, in whom reason and taste exist in a weak, or in an uncultivated state. It is worthy of notice, likewise, that while *second* thoughts are best in matters of judgment, *first* thoughts are always to be preferred in matters that relate to morality. *Second* thoughts, in these cases, are generally parlies between duty and corrupted inclinations. Hence Rousseau has justly said, that “a well regulated moral instinct is the surest guide to happiness.”

It must afford equal pleasure to the lovers of virtue to behold, that our moral conduct and happiness are not committed to the determination of a single legislative power. The conscience, like a wise and faithful legislative

council, performs the office of a check upon the moral faculty, and thus prevents the fatal consequences of immoral actions.

An objection, I foresee, will arise to the doctrine of the influence of physical causes upon the moral faculty, from its being supposed to favour the opinion of the *materiality* of the soul. But I do not see that this doctrine obliges us to decide upon the question of the nature of the soul, any more than the facts which prove the influence of physical causes upon the memory, the imagination, or the judgment. I shall, however, remark upon this subject, that the writers in favour of the *immortality* of the soul have done that truth great injury, by connecting it necessarily with its *immateriality*. The immortality of the soul depends upon the *will* of the Deity, and not upon the supposed properties of spirit. Matter is in its own nature as immortal as spirit. It is resolvable by heat and mixture into a variety of forms; but it requires the same Almighty hand to annihilate it, that it did to create it. I know of no arguments to prove the immortality of the soul, but such as are derived from the Christian revelation.* It would be as reasonable to assert that the basin of the ocean is immortal, from the greatness of its capacity to hold water; or that we are to live for ever in this world, because we are afraid of dying; as to maintain the immortality of the soul, from the greatness of its capacity for knowledge and happiness, or from its dread of annihilation.

I remarked, in the beginning of this discourse, that persons who are deprived of the just exercise of memory, imagination, or judgment, were proper subjects of medicine; and that there are many cases upon record which prove, that the diseases from the derangement of these faculties have yielded to the healing art.

It is perhaps only because the diseases of the moral faculty have not been traced to a connection with physical causes, that medical writers have neglected to give them a place in their systems of nosology, and that so few at-

* "Life and immortality are brought to light *only* through the gospel." 3 Tim. i. 10.

tempts have been hitherto made to lessen or remove them, by physical as well as rational and moral remedies.

I shall not attempt to derive any support to my opinions, from the analogy of the influence of physical causes upon the temper and conduct of brute animals. The facts which I shall produce in favour of the action of these causes upon morals in the human species, will, I hope, render unnecessary the arguments that might be drawn from that quarter.

I am aware, that in venturing upon this subject, I step upon untrodden ground. I feel as Æneas did, when he was about to enter the gates of Avernus, but without a sybil to instruct me in the mysteries that are before me. I foresee, that men who have been educated in the mechanical habits of adopting popular, or established opinions will revolt at the doctrine I am about to deliver, while men of sense and genius will hear my propositions with candour, and if they do not adopt them, will commend that boldness of inquiry, that prompted me to broach them.

I shall begin with an attempt to supply the defects of nosological writers, by naming the partial or weakened action of the moral faculty, MICRONOMIA. The total absence of this faculty I shall call ANOMIA. By the law, referred to in these new genera of *vesaniæ*, I mean the law of nature written in the human heart, and which I formerly quoted from the writings of St. Paul.

In treating of the effects of physical causes upon the moral faculty, it might help to extend our ideas upon this subject, to reduce virtues and vices to certain species, and to point out the effects of particular species of virtue and vice; but this would lead us into a field too extensive for the limits of the present inquiry. I shall only hint at a few cases, and have no doubt but the ingenuity of my auditors will supply my silence, by applying the rest.

It is immaterial, whether the physical causes that are to be enumerated act upon the moral faculty through the medium of the senses, the passions, the memory, or the imagination. Their influence is equally certain, whether they act as remote, predisposing, or occasional causes.

1. The effects of CLIMATE upon the moral faculty claim our first attention. Not only individuals, but nations, derive a considerable part of their moral, as well

as intellectual character, from the different portions they enjoy of the rays of the sun. Irascibility, levity, timidity, and indolence, tempered with occasional emotions of benevolence, are the moral qualities of the inhabitants of warm climates, while selfishness, tempered with sincerity and integrity, form the moral character of the inhabitants of cold countries. The state of the weather, and the seasons of the year also, have a visible effect upon moral sensibility. The month of November, in Great Britain, rendered gloomy by constant fogs and rains, has been thought to favour the perpetration of the worst species of murder, while the vernal sun, in middle latitudes, has been as generally remarked for producing gentleness and benevolence.

2. The effects of DIET upon the moral faculty are more certain, though less attended to, than the effects of climate. "Fulness of bread," we are told, was one of the predisposing causes of the vices of the cities of the plain. The fasts so often inculcated among the Jews were intended to lessen the incentives to vice; for pride, cruelty, and sensuality, are as much the natural consequences of luxury, as apoplexies and palsies. But the *quality* as well as the quantity of aliment has an influence upon morals; hence we find the moral diseases that have been mentioned are most frequently the offspring of animal food. The prophet Isaiah seems to have been sensible of this, when he ascribes such salutary effects to a temperate and vegetable diet. "Butter and honey shall he eat," says he, "*that* he may know to refuse the evil, and to choose the good." But we have many facts which prove the efficacy of a vegetable diet upon the passions. Dr. Arbuthnot assures us, that he cured several patients of irascible tempers, by nothing but a prescription of this simple and temperate regimen.

3. The effects of CERTAIN DRINKS upon the moral faculty are not less observable than upon the intellectual powers of the mind. Fermented liquors, of a good quality, and taken in a moderate quantity, are favourable to the virtues of candour, benevolence and generosity; but when they are taken in excess, or when they are of a bad quality, and taken even in a moderate quantity, they seldom

fail of rousing every latent spark of vice into action. The last of these facts is so notorious, that when a man is observed to be ill-natured or quarrelsome in Portugal, after drinking, it is common in that country to say, that "he has drunken bad wine." While occasional fits of intoxication produce ill-temper in many people, habitual drunkenness (which is generally produced by distilled spirits) never fails to eradicate veracity and integrity from the human mind. Perhaps this may be the reason why the Spaniards, in ancient times, never admitted a man's evidence in a court of justice, who had been convicted of drunkenness. Water is the universal sedative of turbulent passions; it not only promotes a general equanimity of temper, but it composes anger. I have heard several well-attested cases of a draught of cold water having suddenly composed this violent passion, after the usual remedies of reason had been applied to no purpose.

4. **EXTREME HUNGER** produces the most unfriendly effects upon moral sensibility. It is immaterial, whether it act by inducing a relaxation of the solids, or an acrimony of the fluids, or by the combined operations of both those physical causes. The Indians in this country whet their appetites for that savage species of war, which is peculiar to them, by the stimulus of hunger; hence, we are told, they always return meagre and emaciated from their military excursions. In civilized life we often behold this sensation to overbalance the restraints of moral feeling; and perhaps this may be the reason why poverty, which is the most frequent parent of hunger, disposes so generally to theft; for the character of hunger is taken from that vice; it belongs to it "to break through stone walls." So much does this sensation predominate over reason and moral feeling, that cardinal de Retz suggests to politicians, never to risk a motion in a popular assembly, however wise or just it may be, immediately before dinner. That temper must be uncommonly guarded, which is not disturbed by long abstinence from food. One of the worthiest men I ever knew, who made his breakfast his principal meal, was peevish and disagreeable to his friends and family, from the time he left his bed till he sat down to his morning repast, after which, cheerfulness

sparkled in his countenance, and he became the delight of all around him.

5. I hinted formerly, in proving the analogy between the effects of DISEASES upon the intellects and upon the moral faculty, that the latter was frequently impaired by madness. I beg leave to add further upon this head, that not only madness, but the hysteria and hypochondriasis, as well as all those states of the body, whether idiopathic or symptomatic, which are accompanied with preternatural irritability, sensibility, torpor, stupor, or mobility of the nervous system, dispose to vice, either of the body or of the mind. It is in vain to attack these vices with lectures upon morality. They are only to be cured by medicine, particularly by exercise, the cold bath, and by a cold or warm atmosphere. The young woman, whose case I mentioned formerly, that lost her habit of veracity by a nervous fever, recovered this virtue, as soon as her system recovered its natural tone, from the cold weather which happily succeeded her fever.*

6. IDLENESS is the parent of every vice. It is mentioned in the Old Testament as another of the predisposing causes of the vices of the cities of the plain. LABOUR, of all kinds, favours and facilitates the practice of virtue. The country life is happy, chiefly because its laborious employments are favourable to virtue, and unfriendly to vice. It is a common practice, I have been told, for the planters, in the southern states, to consign a house slave, who has become vicious from idleness, to

* There is a morbid state of excitability in the body during the convalescence from fever, which is intimately connected with an undue propensity to venereal pleasures. I have met with several instances of it. The marriage of the celebrated Mr. Howard to a woman who was twice as old as himself, and very sickly, has been ascribed, by his biographer, Dr. Aiken, to *gratitude* for her great attention to him in a fit of sickness. I am disposed to ascribe it to a sudden paroxysm of another passion, which, as a religious man, he could not gratify in any other than in a lawful way. I have heard of two young clergymen who married the women who had nursed them in fits of sickness. In both cases there was great inequality in their years, and condition in life. Their motive was, probably, the same as that which I have attributed to Mr. Howard. Dr. Patrick Russel takes notice of an uncommon degree of venereal excitability which followed attacks of the plague at Messina, in 1743, in all ranks of people. Marriages, he says, were more frequent after it than usual, and virgins were, in some instances, violated, who died of that disease, by persons who had just recovered from it.

the drudgery of the field, in order to reform him. The bridewells and workhouses of all civilized countries prove, that labour is not only a very severe, but the most benevolent of all punishments, inasmuch as it is one of the most suitable means of reformation. Mr. Howard tells us in his *History of Prisons*, that in Holland it is a common saying, "Make men work, and you will make them honest." And over the rasp and spinhouse at Grœningen, this sentiment is expressed (he tells us) by a happy motto :

"Viti^orum semina—otium—labore exhaustiend^um.

The effects of steady labour in early life, in creating virtuous habits, is still more remarkable. The late Anthony Benzet, of this city, whose benevolence was the centinel of the virtue, as well as of the happiness of his country, made it a constant rule, in binding out poor children, to avoid putting them into wealthy families, but always preferred masters for them who worked themselves, and who obliged these children to work in their presence. If the habits of virtue, contracted by means of this apprenticeship to labour, are purely mechanical, their effects are, nevertheless, the same upon the happiness of society, as if they flowed from principle. The mind, moreover, when preserved by these means from weeds, becomes a more mellow soil, afterwards, for moral and rational improvement.

7 The effects of EXCESSIVE SLEEP are intimately connected with the effects of idleness upon the moral faculty ; hence we find that moderate, and even scanty portions of sleep, in every part of the world, have been found to be friendly not only to health and long life, but in many instances to morality. The practice of the monks, who often sleep upon a floor, and who generally rise with the sun, for the sake of mortifying their sensual appetites, is certainly founded in wisdom, and has often produced the most salutary moral effects.

8. The effects of bodily pain upon the moral are not less remarkable than upon the intellectual powers of the mind. The late Dr. Gregory, of the university of Edinburgh, used to tell his pupils, that he always found his perceptions quicker in a fit of the gout, than at any other time. The pangs which attend the dissolution of the body are often accompanied with conceptions and expressions, upon the most ordinary subjects, that discover an uncommon eleva-

tion of the intellectual powers. The effects of bodily pain are exactly the same in rousing and directing the moral faculty. Bodily pain we find, was one of the remedies employed in the Old Testament, for extirpating vice, and promoting virtue : and Mr. Howard tells us, that he saw it employed successfully as a means of reformation, in one of the prisons which he visited. If pain has a physical tendency to cure vice, I submit it to the consideration of parents and legislators, whether moderate degrees of corporal punishments, inflicted for a great length of time, would not be more medicinal in their effects than the violent degrees of them, which are of short duration.

9. Too much cannot be said in favour of **CLEANLINESS**, as a physical means of promoting virtue. The writings of Moses have been called, by military men, the best “orderly book” in the world. In every part of them we find cleanliness inculcated with as much zeal, as if it was part of the moral, instead of the Levitical law. Now it is well known, that the principal design of every precept and rite of the ceremonial parts of the Jewish religion was, to prevent vice, and to promote virtue. All writers upon the leprosy take notice of its connection with a certain vice. To this disease gross animal food, particularly swine’s flesh, and a dirty skin, have been thought to be predisposing causes : hence the reason, probably, why pork was forbidden, and why ablutions of the body and limbs were so frequently inculcated by the Jewish law. Sir John Pringle’s remarks, in his Oration upon captain Cook’s voyage, delivered before the Royal Society, in London, are very pertinent to this part of our subject. “Cleanliness (says he) is conducive to health, but is it not obvious that it also tends to good order and other virtues. Such (meaning the ship’s crew) as were made more cleanly, became more sober, more orderly, and more attentive to duty.” The benefit to be derived by parents and school-masters from attending to these facts, is too obvious to be mentioned.

10. I hope I shall be excused in placing **SOLITUDE** among the physical causes which influence the moral faculty, when I add, that I confine its effects to persons who are irreclaimable by rational or moral remedies. Mr. Howard informs us, that the chaplain of the prison at Liege, in Germany, assured him, “that the most refractory and turbu-

lent spirits became tractable and submissive, by being closely confined for four or five days." In bodies that are predisposed to vice, the stimulus of cheerful, but much more of profane society and conversation upon the animal spirits becomes an exciting cause, and, like the stroke of the flint upon the steel, renders the sparks of vice both active and visible. By removing men out of the reach of this exciting cause, they are often reformed, especially if they are confined long enough to produce a sufficient chasm in their habits of vice. Where the benefit of reflection and instruction from books can be added to solitude and confinement, their good effects are still more certain. To this philosophers and poets in every age have assented, by describing the life of a hermit as a life of passive virtue.

II. Connected with solitude, as a mechanical means of promoting virtue, SILENCE deserves to be mentioned in this place. The late Dr. Fothergill, in his plan of education for that benevolent institution at Ackworth, which was the last care of his useful life, says every thing that can be said in favour of this necessary discipline, in the following words: "To habituate children, from their early infancy, to silence and attention, is of the greatest advantage to them, not only as a preparative to their advancement in religious life, but as the groundwork of a well cultivated understanding to have the active minds of children put under a kind of restraint; to be accustomed to turn their attention from external objects, and habituated to a degree of abstracted quiet; is a matter of great consequence, and lasting benefit to them. Although it cannot be supposed, that young and active minds are always engaged in silence as they ought to be, yet to be accustomed thus to quietness is no small point gained towards fixing a habit of patience, and recollection, which seldom forsakes those, who have been properly instructed in this entrance of the school of wisdom, during the residue of their days.

For the purpose of acquiring this branch of education, children cannot associate too early nor too often with their parents, or with their superiors in age, rank, and wisdom.

12. The effects of MUSIC upon the moral faculty have been felt and recorded in every country. Hence we are able to discover the virtues and vices of different nations, by their tunes, as certainly as by their laws. The effects

of music, when simply mechanical, upon the passions, are powerful and extensive. But it remains yet to determine the degrees of moral ecstasy that may be produced by an attack upon the ear, the reason, and the moral principle, at the same time, by the combined powers of music and eloquence.

13. The **ELOQUENCE** of the **PULPIT** is nearly allied to music in its effects upon the moral faculty. It is true, there can be no permanent change in the temper and moral conduct of a man, that is not derived from the understanding and the will; but we must remember that these two powers of the mind are most assailable, when they are attacked through the avenue of the passions; and these, we know, when agitated by the powers of eloquence, exert a mechanical action upon every power of the soul. Hence we find, in every age and country where Christianity has been propagated, the most accomplished orators have generally been the most successful reformers of mankind. There must be a defect of eloquence in a preacher, who, with the resources for oratory which are contained in the Old and New Testaments, does not produce in every man who hears him at least a temporary love of virtue. I grant that the eloquence of the pulpit alone cannot change men into Christians, but it certainly possesses the power of changing brutes into men. Could the eloquence of the stage be properly directed it is impossible to conceive the extent of its mechanical effects upon morals. The language and imagery of a Shakespeare, upon moral and religious subjects, poured upon the passions and the senses, in all the beauty and variety of dramatic representation; who could resist, or describe their effects?

14. **ODOURS** of various kinds have been observed to act in the most sensible manner upon the moral faculty. Brydone tells us, upon the authority of a celebrated philosopher in Italy, that the peculiar wickedness of the people who live in the neighbourhood of *Ætna* and *Vesuvius* is occasioned chiefly by the smell of the sulphur, and of the hot exhalations which are constantly discharged from those volcanoes. Agreeable odours seldom fail to inspire serenity, and to compose the angry spirits. Hence the pleasure, and one of the advantages, of the flower garden. The smoke of tobacco is likewise of a composing nature, and tends

not only to produce what is called a train in perception, but to hush the passions into silence and order. Hence the practice of connecting the pipe or segar and the bottle together, in public company.

15. It will be sufficient only to mention LIGHT and DARKNESS, to suggest facts in favour of the influence of each of them upon moral sensibility. How often do the peevish complaints of the night, in sickness, give way to the composing rays of the light of the morning? Othello cannot murder Desdemona by candle-light, and who has not felt the effects of a blazing fire upon the gentle passions?*

16. It is to be lamented, that no experiments have as yet been made to determine the effects of all the different species of AIRS, which chemistry has lately discovered; upon the moral faculty. I have authority, from actual experiments, only to declare, that dephlogisticated air, when taken into the lungs, produces cheerfulness, gentleness, and serenity of mind.

17. What shall we say of the effects of MEDICINES upon the moral faculty? That many substances in the materia medica act upon the intellects is well known to physicians. Why should it be thought impossible for medicines to act in like manner upon the moral faculty? May not the earth contain, in its bowels, or upon its surface, antidotes? But I will not blend facts with conjectures. Clouds and darkness still hang upon this part of my subject.

Let it not be suspected, from any thing that I have delivered, that I suppose the influence of physical causes upon the moral faculty renders the agency of divine influence unnecessary to our moral happiness. I only maintain, that the operations of the divine government are carried on in the moral, as in the natural world, by the instrumentality of second causes. I have only trodden in the footsteps of the inspired writers; for most of the physical causes I have enumerated are connected with moral precepts, or have been used as the means of reformation from vice, in the Old and the New Testaments. To the cases that have been

* The temperature of the air has a considerable influence upon moral feeling. Henry the Third of France was always ill humoured, and sometimes cruel, in cold weather. There is a damp air which comes from the sea in Northumberland county in England which is known by the name of the *Seafret*; from its inducing fretfulness in the temper.

mentioned, I shall only add, that Nebuchadnezzar was cured of his pride, by means of solitude and a vegetable diet. Saul was cured of his evil spirit, by means of David's harp, and St. Paul expressly says, "I keep my body under, and bring it into subjection, lest that by any means, when I have preached to others, I myself should be a cast-away." But I will go one step further, and add, in favour of divine influence upon the moral principle, that in those extraordinary cases where bad men are suddenly reformed, without the instrumentality of physical, moral or rational causes, I believe that the organization of those parts of the body, in which the faculties of the mind are seated, undergoes a physical change;* and hence the expression of "a new creature," which is made use of in the scriptures to denote this change, is proper in a literal, as well as a figurative sense. It is probably the beginning of that perfect renovation of the human body, which is predicted by St. Paul in the following words: "For our conversation is in heaven, from whence we look for the Saviour, who shall change our vile bodies, that they may be fashioned according to his own glorious body." I shall not pause to defend myself against the charge of enthusiasm in this place; for the age is at length arrived, so devoutly wished for by Dr. Cheyne, in which men will not be deterred in their researches after truth, by the terror of odious or unpopular names.

I cannot help remarking under this head that if the conditions of those parts of the human body which are connected with the human soul influence morals, the same reason may be given for a virtuous education, that has been admitted for teaching music, and the pronunciation of foreign languages, in the early and yielding state of those organs which form the voice and speech. Such is the effect of a moral education, that we often see its fruits in advanced stages of life, after the religious principles which were connected with it have been renounced; just as we perceive the same care in a surgeon in his attendance upon patients after the sympathy which first produced this care has ceas-

* St. Paul was suddenly transformed from a persecutor into a man of a gentle and amiable spirit. The manner in which this change was effected upon his mind, he tells us in the following words: "Neither circumcision availeth any thing nor uncircumcision, but a new creature. From henceforth let no man trouble me; for I bear in *my body* the marks of our Lord Jesus." Galatians vi. 15. 17.

ed to operate upon his mind. The boasted morality of the deists is, I believe, in most cases, the offspring of habits, produced originally by the principles and precepts of christianity. Hence appears the wisdom of Solomon's advice, "Train up a child in the way he should go, and when he is old he will not," I had almost said, he cannot, "depart from it."

Thus have I enumerated the principal causes which act mechanically upon morals. If, from the combined action of physical powers that are opposed to each other, the moral faculty should become stationary, or if the virtue or vice produced by them should form a neutral quality, composed of both of them, I hope it will not call in question the truth of our general propositions. I have only mentioned the effects of physical causes in a simple state.*

It might help to enlarge our ideas upon this subject, to take notice of the influence of the different stages of society, of agriculture and commerce, of soil and situation, of the different degrees of cultivation of taste, and of the intellectual powers, of the different forms of government, and, lastly, of the different professions and occupations of mankind, upon the moral faculty; but as these act indirectly only, and by the intervention of causes that are unconnected with matter, I conceive they are foreign to the business of the present inquiry. If they should vary the action of the simple physical causes in any degree, I hope it will not call in question the truth of our general propositions, any more than the compound action of physical powers that are opposed to each other. There remain but a few more causes which are of a compound nature, but they are so nearly related to those which are purely mechanical, that I shall beg leave to trespass upon your patience, by giving them a place in my oration.

The effects of imitation, habit, and association, upon morals would furnish ample matter for investigation. Considering how much the shape, texture, and conditions of the human body influence morals, I submit it to the consideration of the ingenious, whether, in our endeavours to

* The doctrine of the influence of physical causes on morals is happily calculated to beget charity towards the failings of our fellow-creatures. Our duty to practise this virtue is enforced by motives drawn from science, as well as from the precepts of christianity.

imitate moral examples, some advantage may not be derived, from our copying the features and external manners of the originals. What makes the success of this experiment probable is, that we generally find men, whose faces resemble each other, have the same manners and dispositions. I infer the possibility of success in an attempt to imitate originals in a manner, that has been mentioned, from the facility with which domestics acquire a resemblance to their masters and mistresses, not only in manners, but in countenance, in those cases where they are tied to them by respect and affection. Husbands and wives also, where they possess the same species of face, under circumstances of mutual attachment often acquire a resemblance to each other.

From the general detestation in which hypocrisy is held, both by good and bad men, the mechanical effects of habit upon virtue have not been sufficiently explored. There are, I am persuaded, many instances, where virtues have been assumed by accident, or necessity, which have become real from habit, and afterwards derived their nourishment from the heart. Hence the propriety of Hamlet's advice to his mother :

“ Assume a virtue if you have it not.
That Monster, Custom, who all sense doth eat
Of habits evil, is angel yet in this,
That to the use of actions fair and good
He likewise gives a frock or livery,
That aptly is put on. Refrain to-night,
And that shall lend a kind of easiness
To the next abstinence ; the next more easy :
For use can almost change the stamp of nature,
And master even the devil or throw him out,
With wondrous potency.”

The influence of ASSOCIATION upon morals opens an ample field for inquiry. It is from this principle, that we explain the reformation from theft and drunkenness in servants, which we sometimes see produced by a draught of spirits, in which tartar emetic had been secretly dissolved. The recollection of the pain and sickness excited by the emetic naturally associates itself with the spirits, so as to render them both equally the objects of aversion. It is by calling in this principle only, that we can account for the conduct of Moses, in grinding the golden calf into a pow-

der, and afterwards dissolving it (probably by means of *hepar sulphuris*) in water, and compelling the children of Israel to drink of it, as a punishment for their idolatry. This mixture is bitter and nauseating in the highest degree. An inclination to idolatry, therefore, could not be felt without being associated with the remembrance of this disagreeable mixture, and of course being rejected, with equal abhorrence. The benefit of corporal punishments, when they are of a short duration, depends in part upon their being connected, by time and place, with the crimes for which they are inflicted. Quick as the thunder follows the lightning, if it were possible, should punishments follow the crimes, and the advantage of association would be more certain, if the spot where they were committed were made the theatre of their expiation. It is from the effects of this association, probably, that the change of place and company, produced by exile and transportation, has so often reclaimed bad men, after moral, rational, and physical means of reformation had been used to no purpose.

As **SENSIBILITY** is the avenue to the moral faculty, every thing which tends to diminish it tends also to injure morals. The Romans owed much of their corruption to the sights of the contests of their gladiators, and of criminals, with wild beasts. For these reasons executions should never be public. Indeed, I believe there are no public punishments of any kind, that do not harden the hearts of spectators, and thereby lessen the natural horror which all crimes at first excite in the human mind.

CRUELTY to brute animals is another means of destroying moral sensibility. The ferocity of savages has been ascribed in part to their peculiar mode of subsistence. Mr. Hogarth points out, in his ingenious prints, the connection between cruelty to brute animals in youth, and murder in manhood. The emperor Domitian prepared his mind, by the amusement of killing flies, for all those bloody crimes which afterwards disgraced his reign. I am so perfectly satisfied of the truth of a connection between morals and humanity to brutes, that I shall find it difficult to restrain my idolatry for that legislature, that shall first establish a system of laws to defend them from outrage and oppression.

In order to preserve the vigour of the moral faculty, it is of the utmost consequence to keep young people as igno-

rant as possible of those crimes that are generally thought most disgraceful to human nature. Suicide, I believe, is often propagated by means of newspapers. For this reason, I should be glad to see the proceedings of our courts kept from the public eye, when they expose or punish monstrous vices.

The last mechanical method of promoting morality that I shall mention, is to keep sensibility alive, by a familiarity with scenes of distress from poverty and disease. Compassion never awakens in the human bosom, without being accompanied by a train of sister virtues. Hence the wise man justly remarks, that "By the sadness of the countenance, the heart is made better."

A late French writer, in his prediction of events that are to happen in the year 4000, says, "That mankind in that æra shall be so far improved by religion and government, that the sick and the dying shall no longer be thrown, together with the dead, into splendid houses, but shall be relieved and protected in a connection with their families and society." For the honour of humanity, an institution,* destined for that distant period, has lately been founded in this city, that shall perpetuate the year 1786 in the history of Pennsylvania. Here the feeling heart, the tearful eye, and the charitable hand, may always be connected together, and the flame of sympathy, instead of being extinguished in taxes, or expiring in a solitary blaze by a single contribution, may be kept alive by constant exercise. There is a necessary connection between animal sympathy and good morals. The priest and the Levite, in the New Testament, would probably have relieved the poor man who fell among thieves, had accident brought them near enough to his wounds. The unfortunate Mrs. Bellamy was rescued from the dreadful purpose of drowning herself, by nothing but the distress of a child, rending the air with its cries for bread. It is probably owing, in some measure, to the connection between good morals and sympathy, that the fair sex, in every age and country, have been more distinguished for virtue than men; for how seldom do we hear of a woman devoid of humanity?

Lastly, **ATTRACTION**, **COMPOSITION**, and **DECOMPOSITION**, belong to the passions as well as to matter. Vices

* A public dispensary.

of the same species attract each other with the most force : hence the bad consequences of crowding young men, whose propensities are generally the same, under one roof in our modern plans of education. The effects of composition and decomposition upon vices appear, in the meanness of the school-boy being often cured by the prodigality of a military life, and by the precipitation of avarice, which is often produced by ambition and love.

If physical causes influence morals in the manner we have described, may they not also influence religious principles and opinions ? I answer in the affirmative ; and I have authority, from the records of physic, as well as from my own observations, to declare, that religious melancholy and madness, in all their variety of species, yield with more facility to medicine, than simply to polemical discourses, or to casuistical advice. But this subject is foreign to the business of the present inquiry.

From a review of our subject, we are led to contemplate, with admiration, the curious structure of the human mind. How distinct are the number, and yet how united ! How subordinate, and yet how co-equal, are all its faculties ! How wonderful is the action of the mind upon the body ! of the body upon the mind ! and of the Divine Spirit upon both ! What a mystery is the mind of man to itself — O ! Nature ! — or, to speak more properly, O ! THOU GOD OF NATURE ! in vain do we attempt to scan THY immensity, or to comprehend THY various modes of existence, when a single particle of light, issued from THYSELF and kindled into intelligence in the bosom of man, thus dazzles and confounds our understandings !

The extent of the moral powers and habits in man is unknown. It is not improbable but the human mind contains principles of virtue, which have never yet been excited into action. We behold with surprise the versatility of the human body in the exploits of tumblers and rope dancers. Even the agility of a wild beast has been demonstrated in a girl of France, and an amphibious nature has been discovered in the human species in a young man in Spain. We listen with astonishment to the accounts of the *memoires* of Mithridates, Cyrus, and Servin. We feel a veneration, bordering upon divine homage, in contemplating the stupendous *understandings* of lord Verulam and sir Isaac

Newton ; and our eyes grow dim, in attempting to pursue Shakespeare and Milton in their immeasurable flights of *imagination*. And if the history of mankind does not furnish similar instances of the versatility and perfection of our species in virtue, it is because the moral faculty has been the subject of less culture and fewer experiments than the body, and the intellectual powers of the mind. From what has been said, the reason of this is obvious. Hitherto the cultivation of the moral faculty has been the business of parents, schoolmasters, and divines.* But if the principles, we have laid down, be just, the improvement and extension of this principle should be equally the business of the legislator, the natural philosopher, and the physician ; and a physical regimen should as necessarily accompany a moral precept, as directions with respect to the air, exercise, and diet, generally accompany prescriptions for the consumption, and the gout. To encourage us to undertake experiments for the improvement of morals, let us recollect the success of philosophy in lessening the number, and mitigating the violence of incurable diseases. The intermitting fever, which proved fatal to two of the monarchs of Britain, is now under absolute subjection to medicine. Continual fevers are much less fatal than formerly. The small-pox is disarmed of its mortality by inoculation, and even the tetanus and the cancer have lately received a check in their ravages upon mankind. But medicine has done more. It has penetrated the deep and gloomy abyss of death, and acquired fresh honours in his cold embraces. Witness the many hundred people who have lately been brought back to life by the successful efforts of the humane societies, which are now established in many parts of Europe, and in some parts of America. Should the same industry and ingenuity, which have produced these triumphs of medicine over diseases and death, be applied to the moral science, it is highly probable that most of those baneful vices, which deform the human breast, and convulse the nations of the

* The people commonly called Quakers, and the Methodists, make use of the greatest number of physical remedies in their religious and moral discipline, of any sects of Christians ; and hence we find them every where distinguished for their good morals. There are several excellent *physical* institutions in other churches ; and if they do not produce the same moral effects that we observe from physical institutions among those two modern sects, it must be ascribed to their being more neglected by the members of those churches.

earth, might be banished from the world. I am not so sanguine as to suppose, that it is possible for man to acquire so much perfection from science, religion, liberty, and good government, as to cease to be mortal ; but I am fully persuaded, that from the combined action of causes, which operate at once upon the reason, the moral faculty, the passions, the senses, the brain, the nerves, the blood, and the heart, it is possible to produce such a change in his moral character, as shall raise him to a resemblance of angels ; nay, more, to the likeness of God himself. The state of Pennsylvania still deplores the loss of a man, in whom not only reason and revelation, but many of the physical causes that have been enumerated, concurred to produce such attainments in moral excellency, as have seldom appeared in a human being. This amiable citizen considered his fellow-creature, man, as God's extract, from his own works ; and whether this image of himself was cut out from ebony or copper ; whether he spoke his own, or a foreign language ; or whether he worshipped his Maker with ceremonies, or without them, he still considered him as a brother, and equally the object of his benevolence. Poets and historians, who are to live hereafter, to you I commit his panegyric ; and when you hear of a law for abolishing slavery in each of the American states, such as was passed in Pennsylvania in the year 1780 ; when you hear of the kings and queens of Europe publishing edicts for abolishing the trade in human souls ; and, lastly, when you hear of schools and churches, with all the arts of civilized life, being established among the nations of Africa, then remember and record, that this revolution in favour of human happiness was the effect of the labours, the publications, the private letters, and the prayers of ANTHONY BENEZET.*

* This worthy man was descended from an ancient and honourable family that flourished in the court of Louis XIV. With liberal prospects in life, he early devoted himself to teaching an English school ; in which, for industry, capacity, and attention to the morals and principles of the youth committed to his care, he was without an equal. He published many excellent tracts against the African trade, against war, and the use of spirituous liquors, and one in favour of civilizing and Christianizing the Indians. He wrote to the queen of Great Britain, and the queen of Portugal to use their influence in their respective courts to abolish the African trade. He also wrote an affectionate letter to the king of Prussia, to dissuade him from making war. The history of his life affords a re-

I return from this digression, to address myself in a particular manner to you, VENERABLE SAGES and FELLOW CITIZENS in the REPUBLIC OF LETTERS. The influence of philosophy, we have been told, has already been felt in courts. To increase, and complete, this influence, there is nothing more necessary, than for the numerous literary societies in Europe and America to add the SCIENCE OF MORALS to their experiments and inquiries. The godlike scheme of Henry IV. of France, and of the illustrious queen Elizabeth, of England, for establishing a perpetual peace in Europe, may be accomplished without a system of jurisprudence, by a confederation of learned men and learned societies. It is in their power, by multiplying the objects of human reason, to bring the monarchs and rulers of the world under their subjection, and thereby to extirpate war, slavery, and capital punishments, from the list of human evils. Let it not be suspected that I detract, by this declaration, from the honour of the Christian religion. It is true, Christianity was propagated without the aid of human learning; but this was one of those miracles, which was necessary to establish it, and which, by repetition, would cease to be a miracle. They misrepresent the Christian religion, who suppose it to be wholly an internal revelation, and addressed only to the moral faculties of the mind. The truths of Christianity afford the greatest scope for the human understanding, and they will become intelligible to us, only in proportion as the human genius is stretched by means of philosophy, to its utmost dimensions. Errors may be opposed to errors; but truths, upon all subjects, mutually support each other. And perhaps one reason why some parts of the Christian revelation are still involved in obscurity, may be occasioned by our imperfect knowledge of the phenomena and laws of nature. The truths of philosophy and Christianity dwell alike in the mind of the Deity, and reason and religion are equally the offspring of his goodness. They must,

markable instance, how much it is possible for an individual to accomplish in the world; and that the most humble stations do not preclude good men from the most extensive usefulness. He bequeathed his estate (after the death of his widow) to the support of a school for the education of negro children, which he had founded and taught for several years before he died. He departed this life in May, 1784, in the seventy-first year of his age, in the meridian of his usefulness, universally lamented by persons of all ranks and denominations.

therefore, stand and fall together. By reason, in the present instance, I mean the power of judging of truth, as well as the power of comprehending it. Happy æra ! when the divine and the philosopher shall embrace each other, and unite their labours for the reformation and happiness of mankind !

ILLUSTRIOUS COUNSELLORS and SENATORS of Pennsylvania !* I anticipate your candid reception of this feeble effort to increase the quantity of virtue in our republic. It is not my business to remind you of the immense resources for greatness, which nature and Providence have bestowed upon our state. Every advantage which France has derived from being placed in the centre of Europe, and which Britain has derived from her mixture of nations, Pennsylvania has opened to her. But my business, at present, is to suggest the means of promoting the happiness, not the greatness, of the state. For this purpose, it is absolutely necessary that our government, which unites into one, all the minds of the state, should possess, in an eminent degree, not only the understanding, the passions, and the will, but, above all, the moral faculty and the conscience of an individual. Nothing can be politically right, that is morally wrong ; and no necessity can ever sanctify a law, that is contrary to equity. VIRTUE is the soul of a republic. To promote this, laws for the suppression of vice and immorality will be as ineffectual, as the increase and enlargement of jails. There is but one method of preventing crimes, and of rendering a republican form of government durable, and that is, by disseminating the seeds of virtue and knowledge through every part of the state, by means of proper modes and places of education, and this can be done effectually only by the interference and aid of the legislature. I am so deeply impressed with the truth of this opinion, that were this evening to be the last of my life, I would not only say to the asylum of my ancestors, and my beloved native country, with the patriot of Venice, "Esto perpetua," but I would add, as the last proof of my affection for her, my parting advice to the guardians of her liberties, "To establish and support PUBLIC SCHOOLS in every part of the state."

* The president and supreme executive council, and the members of the general assembly of Pennsylvania, attended the delivery of the oration, in the hall of the university, by invitation from the Philosophical Society.

AN ACCOUNT
OF THE
INFLUENCE OF THE MILITARY AND POLITICAL EVENTS
OF THE
AMERICAN REVOLUTION
UPON
THE HUMAN BODY.

AN ACCOUNT, &c.

THERE were several circumstances peculiar to the American revolution, which should be mentioned previously to an account of the influence of the events which accompanied it upon the human body.

1. The revolution interested every inhabitant of the country of both sexes, and of every rank and age that was capable of reflection. An indifferent, or neutral, spectator of the controversy was scarcely to be found in any of the states.

2. The scenes of war and government, which it introduced, were new to the greatest part of the inhabitants of the United States, and operated with all the force of *novelty* upon the human mind.

3. The controversy was conceived to be the most important of any that had ever engaged the attention of mankind. It was generally believed, by the friends of the revolution, that the very existence of *freedom*, upon our globe, was involved in the issue of the contest in favour of the United States.

4. The American revolution, included in it the cares of government, as well as the toils and dangers of war. The American mind was, therefore, frequently occupied, at the *same time*, by the difficult and complicated duties of political and military life.

5. The revolution was conducted by men, who, had been born *free*, and whose sense of the blessings of liberty was of course more exquisite than if they had just emerged from a state of slavery.

6. The greatest part of the soldiers in the armies of the United States, had family connections and property in the country.

7. The war was carried on by the Americans against a nation, to whom they had long been tied by the numerous obligations of consanguinity, laws, religion, commerce, language, interest, and a mutual sense of national glory. The resentments of the Americans of course rose, as is usual in all disputes, in proportion to the number and force of these ancient bonds of affection and union.

8. A predilection to a limited monarchy, as an essential part of a free and safe government, and an attachment to the reigning king of Great Britain (with a very few exceptions) were universal in every part of the United States.

9. There was at one time a sudden dissolution of civil government in *all*, and of ecclesiastical establishments in several, of the states.

10. The expenses of the war were supported by means of a paper currency, which was continually depreciating.

From the action of each of these causes, and frequently from their combination in the same persons, effects might reasonably be expected, both upon the mind and body, which have seldom occurred; or if they have, I believe were never fully recorded in any age or country.

It might afford some useful instruction, to point out the influence of the military and political events of the revolution upon the understandings, passions, and morals of the citizens of the United States; but my business in the present inquiry is only to take notice of the influence of those events upon the human body, through the medium of the mind.

I shall first mention the effects of the military, and, secondly, of the political events of the revolution. The last must be considered in a two-fold view, accordingly as they affected the friends, or the enemies, of the revolution.

I. In treating of the effects of the military events, I shall take notice, first, of the influence of *actual* war, and, secondly, of the influence of the military life.

In the beginning of a battle, I have observed *thirst* to be a very common sensation among both officers and soldiers. It occurred where no exercise, or action of the body, could have excited it.

Many officers have informed me, that after the first onset in a battle they felt a glow of heat, so universal as to be perceptible in both their ears. This was the case, in a par-

ticular manner, in the battle of Princeton, on the third of January, in the year 1777, on which day the weather was remarkably cold.

A veteran colonel of a New England regiment, whom I visited at Princeton, and who was wounded in the hand at the battle of Monmouth, on the 28th of June, 1778 (a day in which the mercury stood at 90° of Fahrenheit's thermometer) after describing his situation at the time he received his wound, concluded his story by remarking, "that fighting was hot work on a cold day, but much more so on a warm day." The many instances which appeared after that memorable battle, of soldiers who were found among the slain without any marks of wounds or violence upon their bodies, were probably occasioned by the heat excited in the body, by the emotions of the mind, being added to that of the atmosphere.

Soldiers bore operations of every kind, immediately *after* a battle, with much more fortitude than they did at *any time* afterwards.

The effects of the military life upon the human body come next to be considered under this head.

In another place I have mentioned three cases of pulmonary consumption being perfectly cured by the diet and hardships of a camp life.

Doctor Blane, in his valuable observations on the diseases incident to seamen, ascribes the extraordinary healthiness of the British fleet in the month of April, 1782, to the effects produced on the spirit of the soldiers and seamen, by the victory obtained over the French fleet on the 12th of that month; and relates, upon the authority of Mr. Ives, an instance, in the war between Great Britain and the combined powers of France and Spain, in 1744, in which the scurvy, as well as other diseases, were checked by the prospect of a naval engagement.

The American army furnished an instance of the effects of victory upon the human mind, which may serve to establish the inferences from the facts related by Doctor Blane. The Philadelphia militia who joined the remains of General Washington's army, in December, 1776, and shared with them a few days afterwards in the capture of a large body of Hessians at Trenton, consisted of 1500 men, most of whom had been accustomed to the habits of a city life.

These men slept in tents and barns, and sometimes in the open air, during the usual colds of December and January; and yet there were but two instances of sickness, and only one of death, in that body of men in the course of nearly six weeks, in those winter months. This extraordinary healthiness of so great a number of men, under such trying circumstances, can only be ascribed to the vigour infused into the human body by the victory of Trenton having produced insensibility to all the usual remote causes of disease.

Militia officers and soldiers, who enjoyed good health during a campaign, were often affected by fevers, and other diseases, as soon as they returned to their respective homes. I knew one instance of a militia captain, who was seized with convulsions the first night he lay on a feather bed, after sleeping several months on a matress, or upon the ground. These affections of the body appeared to be produced only by the sudden abstraction of that tone in the system, which was excited by a sense of danger, and the other invigorating objects of a military life.

The *NOSTALGIA* of Doctor Cullen, or the *home-sickness*, was a frequent disease in the American army, more especially among the soldiers of the New England states. But this disease was suspended by the superior action of the mind, under the influence of the principles which governed common soldiers in the American army. Of this General Gates furnished me with a remarkable instance in 1776, soon after his return from the command of a large body of regular troops and militia at Ticonderoga. From the effects of the nostalgia, and the feebleness of the discipline which was exercised over the militia, dissertions were very frequent and numerous in his army, in the latter part of the campaign; and yet during the *three weeks* in which the general expected every hour an attack to be made upon him by General Burgoyne, there was not a single desertion from his army, which consisted at that time of 10,000 men.

The patience, firmness and magnanimity, with which the officers and soldiers of the American army endured the complicated evils of hunger, cold and nakedness, can only be ascribed to an insensibility of body produced by an uncommon tone of mind, excited by the love of liberty and their country.

Before I proceed to the second general division of this subject, I shall take notice, that more instances of apoplexy occurred in the city of Philadelphia, in the winter of 1774-5, than had been known in former years. I should have hesitated in recording this fact, had I not found the observations supported by a fact of the same kind, and produced by a nearly similar cause, in the appendix to the practical works of Doctor Baglivi, professor of physic and anatomy at Rome. After a very wet season in the winter of 1694-5, he informs us, that "apoplexies displayed their rage; and perhaps (adds our author) some part of this epidemic illness was owing to the universal grief and domestic care, occasioned by all Europe being engaged in a war. All commerce was disturbed, and all the avenues of peace blocked up, so that the strongest heart could scarcely bear the thoughts of it." The winter of 1774-5 was a period of uncommon anxiety among the citizens of America. Every countenance wore the marks of painful solicitude for the event of a petition to the throne of Britain, which was to determine whether reconciliation, or a civil war, with all its terrible and distressing consequences, were to take place. The apoplectic fit, which deprived the world of the talents and virtues of Peyton Randolph, while he filled the chair of congress, in 1775, appeared to be occasioned in part by the pressure of the uncertainty of those great events upon his mind. To the name of this illustrious patriot, several others might be added, who were affected by the apoplexy in the same memorable year. At this time a difference of opinion upon the subject of the contest with Great Britain had scarcely taken place among the citizens of America.

II. The political events of the revolution produced different effects upon the human body, through the medium of the mind, according as they acted upon the friends or enemies of the revolution.

I shall first describe its effects upon the former class of citizens of the United States.

Many persons, of infirm and delicate habits, were restored to perfect health, by the change of place, or occupation, to which the war exposed them. This was the case in a more especial manner with hysterical women, who were much interested in the successful issue of the contest. The same effects of a civil war upon the hystera, were obser-

ved by Doctor Cullen in Scotland, in the years 1745 and 1746. It may perhaps help to extend our ideas of the influence of the passions upon diseases, to add, that when either love, jealousy, grief, or even devotion, wholly engross the female mind, they seldom fail, in like manner, to cure or to suspend hysterical complaints.

An uncommon cheerfulness prevailed every where, among the friends of the revolution. Defeats, and even the loss of relations and property, were soon forgotten in the great objects of the war.

The population in the United States was more rapid from births during the war, than it had ever been in the same number of years since the settlement of the country.

I am disposed to ascribe this increase of births *chiefly* to the quantity and extensive circulation of money, and to the facility of procuring the means of subsistence during the war, which favoured marriages among the labouring part of the people.* But I have sufficient documents to prove, that marriages were more fruitful than in former years, and that a considerable number of unfruitful marriages, became fruitful during the war. In 1783 the year of the peace, there were several children born of parents who had lived many years together without issue.

Mr. Hume informs us, in his History of England, that some old people, upon hearing the news of the restoration of Charles II. died suddenly of joy. There was a time when I doubted the truth of this assertion; but I am now disposed to believe it, from having heard of a similar effect from an agreeable political event, in the course of the American revolution. The door keeper of congress, an aged man, died suddenly, immediately after hearing of the capture of lord Cornwallis's army. His death was universally ascribed to a violent emotion of political joy. This species of joy appears to be one of the strongest emotions that can agitate the human mind.

Perhaps the influence of that ardour in trade and speculation, which seized many of the friends of the revolu-

* Wheat, which was sold before the war for seven shillings and six pence was sold for several years *during* the war for four, and in some places for two and sixpence Pennsylvania currency per bushel. Beggars of every description disappeared in the year 1776, and were seldom seen till near the close of the war.

tion, and which was excited by the fallacious nominal amount of the paper money, should rather be considered as a disease, than as a passion. It unhinged the judgment, deposed the moral faculty, and filled the imagination, in many people, with airy and impracticable schemes of wealth and grandeur. Desultory manners, and a peculiar species of extempore conduct, were among its characteristic symptoms. It produced insensibility to cold, hunger, and danger. The trading towns, and in some instances the extremities of the United States, were frequently visited in a few hours or days by persons affected by this disease; and hence "to travel with the speed of a speculator," became a common saying in many parts of the country. This species of insanity (if I may be allowed to call it by that name) did not require the confinement of a bedlam to cure it, like the South-Sea, madness described by Doctor Mead. Its remedies were the depreciation of the paper money, and the events of the peace.

The political events of the revolution produced upon its enemies very different effects from those which have been mentioned.

The hypochondriasis of Doctor Cullen occurred, in many instances, in persons of this description. In some of them, the terror and distress of the revolution brought on a true melancholia.* The causes which produced these diseases may be reduced to four heads. 1. The loss of former power or influence in government. 2. The destruction of the hierarchy of the English church in America. 3. The change in the habits of diet, and company, and manners, produced by the annihilation of just debts by means of depreciated paper money. And 4. The neglect, insults, and oppression, to which the loyalists were exposed, from individuals, and, in several instances, from the laws of some of the states.

It was observed in South Carolina, that several gentlemen, who had protected their estates by swearing allegiance to the British government, died soon after the evacuation of Charleston, by the British army. Their deaths were ascribed to the neglect with which they were treated by their ancient friends, who had adhered to the govern-

* *Insania partialis sine dyspepsia*, of Doctor Cullen.

ment of the United States. The disease was called, by the common people, the *protection fever*.

From the causes which produced this hypochondriasis, I have taken the liberty of distinguishing it by the name of *revolutionaria*.

In some cases, this disease was rendered fatal by exile and confinement; and in others, by those persons who were afflicted with it seeking relief from spirituous liquors.

The termination of the war by the peace in 1783 did not terminate the American revolution. The minds of the citizens of the United States were wholly unprepared for their new situation. The excess of the passion for liberty, inflamed by the successful issue of the war, produced, in many people, opinions and conduct, which could not be removed by reason nor restrained by government. For a while, they threatened to render abortive the goodness of Heaven to the United States, in delivering them from the evils of slavery and war. The extensive influence which these opinions had upon the understandings, passions, and morals of many of the citizens of the United States, constituted a form of insanity, which I shall take the liberty of distinguishing by the name of *anarchia*.

I hope no offence will be given by the freedom of any of these remarks. An inquirer after philosophical truth should consider the passions of men in the same light that he does the laws of matter or motion. The friends and enemies of the American revolution must have been more, or less, than men, if they could have sustained the magnitude and rapidity of the events that characterized it, without discovering some marks of human weakness, both in body and mind. Perhaps these weaknesses were permitted, that human nature might receive fresh honours in America, by the contending parties (whether produced by the controversies about independence or the national government) mutually forgiving each other, and uniting in plans of general order, and happiness.

AN INQUIRY
INTO THE RELATION OF
TASTES AND ALIMENTS
TO EACH OTHER,
AND INTO THE
INFLUENCE OF THIS RELATION
UPON
HEALTH AND PLEASURE.

AN INQUIRY, &c.

IN entering upon this subject, I feel like the clown, who, after several unsuccessful attempts to play upon a violin, threw it hastily from him, exclaiming at the same time, that "there was music in it," but he could not bring it out.

I shall endeavour, by a few brief remarks, to lay a foundation for more successful inquiries upon this difficult subject.

Attraction and repulsion seem to be the active principles of the universe. They pervade not only the greatest, but the minutest, works of nature. Salts, earths, inflammable bodies, metals, and vegetables, have all their respective relations to each other. The order of these relations is so uniform, that it has been ascribed by some philosophers to a latent principle of intelligence pervading each of them.

Colours, odours, and sounds, have likewise their respective relations to each other. They become agreeable and disagreeable, only in proportion to the natural or unnatural combination which takes place between each of their different species.

It is remarkable, that the number of original colours and notes in music is exactly the same. All the variety in both proceeds from the difference of combination. An arbitrary combination of them is by no means productive of pleasure. The relation which every colour and sound bear to each other, was as immutably established at the creation, as the order of the heavenly bodies, or as the relation of the objects of chemistry to each other.

But this relation is not confined to colours and sounds alone. It probably extends to the objects of human ali-

ment. For example, bread and meat, meat and salt, the alkalescent meats and acescent vegetables, all harmonize with each other upon the tongue ; while fish and flesh, butter and raw onions, fish and milk, when combined, are all offensive to a pure and healthy taste.

It would be agreeable to trace the analogy of sounds and tastes. They have both their flats and their sharps. They are both improved by the contrast of discords. Thus pepper, and other condiments (which are disagreeable when taken by themselves) enhance the relish of many of our aliments, and they are both delightful in proportion as they are simple in their composition. To illustrate this analogy by more examples from music would lead us from the subject of the present inquiry.

It is observable that the tongue and the stomach, like instinct and reason, are, by nature, in unison with each other. One of those organs must always be disordered, when they disagree in a single article of aliment. When they both unite in articles of diet that were originally disagreeable, it is owing to a perversion in each of them, similar to that which takes place in the human mind, when both the moral faculty and the conscience lose their natural sensibility to virtue and vice.

Unfortunately for this part of science, the taste and the stomach are so much perverted in infancy and childhood by heterogenous aliment, that it is difficult to tell what kinds and mixtures of food are natural, and what are artificial. It is true, the system possesses a power of accommodating itself both to artificial food, and to the most discordant mixtures of that which is natural ; but may we not reasonably suppose, that the system would preserve its natural strength and order much longer, if no such violence had been offered to it ?

If the relation of aliments to each other follows the analogy of the objects of chemistry, then their union will be influenced by many external circumstances, such as heat and cold, dilution, concentration, rest, motion, and the addition of substances which promote unnatural, or destroy natural mixtures. This idea enlarges the field of inquiry before us, and leads us still further from facts and certainty upon this subject, but at the same time it does

not preclude us from the hope of obtaining both ; for every difficulty that arises out of this view of the subject may be removed by observation and experiment.

I come now to apply these remarks to health and pleasure. I shall select only a few cases for this purpose ; for if my principles be true, my readers cannot avoid discovering many other illustrations of them.

1. When an article of diet is grateful to the taste, and afterwards disagrees with the stomach, may it not be occasioned by some other kind of food, or by some drink being taken into the stomach, which refuses to unite with the offending article of diet ?

2. May not the uneasiness which many persons feel, after a moderate meal, arise from its having consisted of articles of aliment which were not related to each other ?

3. May not the delicacy of stomach which sometimes occurs after the fortieth, or forty-fifth year of human life, be occasioned by nature recovering her empire in the stomach, so as to require simplicity in diet, or such articles only of aliment as are related ? May not this be the reason why most people, who have passed those periods of life, are unable to retain or to digest fish and flesh at the same time, and why they generally dine only upon one kind of food ?

4. Is not the language of nature in favour of simplicity in diet discovered, by the avidity with which the luxurious and intemperate often seek relief from variety and satiety, by retreating to spring water for drink, and to bread and milk for aliment ?

5. May not the reason why plentiful meals of fish, venison, oysters, beef, or mutton, when eaten alone, lie so easily in the stomach, and digest so speedily, be occasioned by no other food being taken with them ? A pound, and even more, of the above articles, frequently oppress the system much less than half the quantity of heterogeneous aliments.

6. Does not the facility with which a due mixture of vegetable and animal food digests in the stomach, indicate the certainty of their relation to each other ?

7. May not the peculiar good effects of a diet wholly vegetable, or animal, be occasioned by the more frequent

and intimate relation of the articles of the same kingdoms to each other? And may not this be the reason why so few inconveniences are felt from the mixture of a variety of vegetables in the stomach?

8. May not the numerous acute and chronic diseases of the rich and luxurious arise from heterogeneous aliments being distributed in a *diffused*, instead of a *mixed* state, through every part of the body.

9. May not the many cures which are ascribed to certain articles of diet be occasioned more by their being taken alone, than to any medicinal quality inherent in them? A diet of oysters in one instance, of strawberries in another, and of sugar of roses, in many instances, has cured violent and dangerous diseases of the breast.* Grapes, according to Doctor Moore, when eaten in large quantities, have produced the same salutary effect. A milk diet, persisted in for several years, has cured the gout and epilepsy. I have seen many cases of dyspepsia cured by a simple diet of beef and mutton, and have heard of a well-attested case of a diet of veal alone having removed the same disease. Squashes, and turnips likewise, when taken by themselves, have cured that distressing complaint in the stomach. It has been removed even by milk, when taken by itself in a moderate quantity.† The further the body, and more especially the stomach, recede from health, the more this simplicity of diet becomes necessary. The appetite in these cases does not speak the language of uncorrupted nature. It frequently calls for various and improper aliment; but this is the effect of intemperance having produced an early breach between the taste and the stomach.

Perhaps the extraordinary cures of obstinate diseases, which are sometimes performed by persons not regularly educated in physic, may be occasioned by a long and steady perseverance in the use of a single article, of the *materia medica*. Those chemical medicines which decompose each other, are not the only substances which defeat the intention of the prescriber. Galenical medicines, by combination, I believe, frequently produce effects that are

* Vansweiten, 1209. 3.

† Medical Observations and Inquiries, vol. vi. p. 310. 319.

of a compound and contrary nature to their original and simple qualities. This remark is capable of extensive application, but I quit it as a digression from the subject of this inquiry.

10. I wish it to be observed, that I have condemned the mixture of different aliments in the stomach only in a few cases, and under certain circumstances. It remains yet to determine by experiments, what changes are produced upon aliments by heat, dilution, addition, concentration, motion, rest, and the addition of uniting substances, before we can decide upon the relation of aliments to each other, and the influence of that relation upon health. The olla podrida of Spain is said to be a pleasant and wholesome dish. It is probably rendered so, by a previous tendency of all its ingredients to putrefaction, or by means of heat producing a new arrangement, or additional new relations of all its parts. I suspect heat to be a powerful agent in disposing heterogeneous aliments to unite with each other; and hence the mixture of aliments is probably less unhealthy in France and Spain, than in England, where so much less fire is used in preparing them, than in the former countries.

As too great a mixture of glaring colours, which are related to each other, becomes painful to the eye, so too great a mixture of related aliments oppresses the stomach, and debilitates the powers of the system. The original colours of the sky, and of the surface of the globe, have ever been found the most permanently agreeable to the eye. In like manner, I am disposed to believe that there are certain simple aliments which corresponds, in their sensible qualities, with the intermediate colours of *blue* and *green*, that are most permanently agreeable to the tongue and stomach, and that every deviation from them is a departure from the simplicity of health and nature.

11. While nature seems to have limited us to simplicity in aliment, is not this restriction abundantly compensated by the variety of tastes which she allows us to impart to it, in order to diversify and increase the pleasure of eating? It is remarkable that salt, sugar, mustard, horse-radish, capers, and spices of all kinds, according to Mr.

Gosse's experiments, related by Abbè Spallanzani,* all contributed not only to render aliments savoury, but to promote their digestion.

12. When we consider, that part of the art of cookery consists in rendering the taste of aliments agreeable, is it not probably that the pleasure of eating might be increased beyond our present knowledge upon that subject, by certain new arrangements or mixtures of the substances which are used, to impart a pleasant taste to our aliment?

13. Should philosophers ever stoop to this subject, may they not discover and ascertain a table of the relations of sapid bodies to each other, with the accuracy that they have ascertained the relation of the numerous objects of chemistry to each other?

14. When the tongue and stomach agree in the same kinds of aliment, may not the increase of the pleasure of eating be accompanied with an increase of health and prolongation of life?

15. Upon the pleasure of eating, I shall add the following remarks. In order to render it truly exquisite, it is necessary that all the senses, except that of taste, should be as *quiescent* as possible. Those persons mistake the nature of the appetite for food, who attempt to whet it by accompanying a dinner by a band of music, or by connecting the dining table with an extensive and delightful prospect. The undue excitement of one sense always produces weakness in another. Even conversation sometimes detracts from the pleasure of eating; hence great feeders love to eat in silence, or alone; and hence the speech of a passionate Frenchman, while dining in a talkative company, was not so improper as might be at first imagined. "Hold your tongues (said he) I cannot taste my dinner." I know a physician, who upon the same principle, always shuts his eyes, and requests silence in a sick chamber, when he wishes to determine by the pulse the propriety of blood-letting, in cases where its indication is doubtful. His perceptions become more distinct, by confining his whole attention to the sense of feeling.

It is impossible to mention the circumstance of the

* Dissertations, vol. i. p. 326.

senses acting only in succession to each other in the enjoyment of pleasure, without being struck with the impartial goodness of Heaven, in placing the rich and the poor so much upon a level in the pleasures of the table. Could the numerous objects of pleasure, which are addressed to the ears and the eyes, have been possessed at the same time with the pleasure of eating, the rich would have commanded three times as much pleasure in that enjoyment as the poor; but this is so far from being the case, that a king has no advantage over a beggar, in eating the same kind of aliment.

THE RESULT OF OBSERVATIONS

MADE

UPON THE DISEASES

WHICH OCCURRED

IN THE MILITARY HOSPITALS

OF THE UNITED STATES,

DURING THE REVOLUTIONARY WAR BETWEEN GREAT BRITAIN
AND THE UNITED STATES.

Vol. I.

T

RESULT OF OBSERVATIONS, &c.

1. THE army, when in tents, was always more sickly than in the open air. It was likewise more healthy when it was kept in motion than when it lay in an encampment.

2 Young men under twenty years of age were subject to the greatest number of camp diseases.

3. The southern troops were more sickly than the northern or eastern troops.

4. The native Americans were more sickly than the natives of Europe who served in the American army.

5. Men above thirty and five and thirty years of age were the hardiest soldiers in the army. Perhaps the reason why the natives of Europe were more healthy than the native Americans was, they were more advanced in life.

6. The southern troops sickened from the want of salt provisions. Their strength and spirits were restored only by means of salted meat. I once saw a private in a Virginia regiment throw away his ration of choice fresh beef, and give a dollar for a pound of salted bacon.

7. Those officers who wore flannel shirts or waistcoats next their skins, in general, escaped fevers and diseases of all kinds.

8. The principal diseases in the hospitals were the typhus gravior and mitior of Dr. Cullen. Men who came into the hospitals with pleurisies or rheumatisms soon lost the types of their original diseases, and suffered, or died, by the above-mentioned states of fever.

9. The typhus mitior always prevailed most, and with the worst systems, in winter. A free air which could only be obtained in summer, always prevented, or mitigated it.

10. In all those cases, where the contagion was received, cold seldom failed to render it active. Whenever a hospital was removed in winter, one half of the patients generally sickened on the way, or soon after they arrived at the place to which they were sent.

11. Drunken soldiers and convalescents were most subject to this fever.

12. Those patients in this fever, who had large ulcers on their backs or limbs, generally recovered.

13. I met with several instances of buboes, also of ulcers in the throat, as described by Doctor Donald Monro. They were mistaken by some of the junior surgeons for venereal sores, but they yielded to the common remedies of the hospital fever.

14. There were many instances of patients in this fever, who suddenly fell down dead, upon being moved, without any previous symptoms of approaching dissolution. This was more especially the case, when they arose to go to stool.

15. The contagion of this fever was frequently conveyed from the hospital to the camp, by means of blankets and clothes.

16. Those black soldiers who had been previously slaves, died in a greater proportion by this fever, or had a much slower recovery from it, than the same number of white soldiers.

17. The remedies which appeared to do most service in this disease were vomits of tartar emetic, gentle doses of laxative salts, bark, wine, volatile salts, opium and blisters.

18. An emetic seldom failed of checking this fever, if exhibited while it was in a *forming* state, and before the patient was confined to his bed.

19. Many causes concurred to produce, and increase this fever; such as the want of cleanliness, excessive fatigue, the ignorance or negligence of officers in providing suitable diet and accommodations for their men, the general use of linen instead of woollen clothes in the summer months, and the crowding too many patients together in one hospital, with such other inconveniences and abuses, as usually follow the union of the *purveying* and

directing departments of hospitals in the *same* persons. But there is one more cause of this fever which remains to be mentioned, and that is, the sudden assembling of a great number of persons together of different habits and manners, such as the soldiers of the American army were in the years 1776 and 1777. Doctor Blane informs us, in his observations upon the diseases of seamen, "that it sometimes happens that a ship with a long established crew shall be very *healthy*, yet if strangers are introduced among them, who are also *healthy*, sickness will be mutually produced." The history of diseases furnishes many proofs of the truth of this assertion.* It is very remarkable, that while the American army at Cambridge, in the year 1775, consisted only of New Englandmen (whose habits and manners were the same) there was scarcely any sickness among them. It was not till the troops of the eastern, middle, and southern states met at New York and Ticonderoga, in the year 1776, that the typhus became universal, and spread with such peculiar mortality in the armies of the United States.

20. The dysentery prevailed, in the summer of 1777, in the military hospitals of New Jersey, but with very few instances of mortality. This dysentery was frequently followed by an obstinate diarrhœa, in which the warm bath was found in many cases to be an effectual remedy.

21. I saw several instances of fevers occasioned by the use of the common ointment made of the flour of sulphur and hog's lard, for the cure of the itch. The fevers were probably brought on by the exposure of the body to the cold air, in the usual method in which that ointment is applied. I have since learned, that the itch may be cured as speedily by rubbing the parts affected, two or three times, with the dry flour of sulphur, and that no inconvenience, and scarcely any smell, follow this mode of using it.

22. In gun-shot wounds of the joints, Mr. Ranby's advice of amputating the limb was followed with success. I saw two cases of death where this advice was neglected.

* "Cleanliness is founded on a natural aversion to what is unseemly and offensive in the persons of others; and there seems also to be an instinctive horror at strangers implanted in human nature for the same purpose, as is visible in young children, and uncultivated people. In the early ages of Rome, the same word signified both a stranger and an enemy." Dr. Blane, p. 225.

23. There was one instance of a soldier who lost his hearing, and another of a soldier who had been deaf who recovered his hearing, by the noise of artillery in battle.

24. Those soldiers who were billeted in private houses generally escaped the hospital fever, and recovered soonest from all their diseases.

25. Hospitals built of course logs, with *ground* floors, with fire-places in the middle of them, and a hole in the roof, for the discharge of smoke, were found to be very conducive to the recovery of the soldiers from the hospital fever. This form of a military hospital was introduced into the army by Dr. Tilton, of the state of Delaware.*

26. In fevers and dysenteries, those soldiers recovered most certainly, and most speedily, who lay at the greatest distance from the walls of the hospitals. This important fact was communicated to me by the late Dr. Beardsley, of Connecticut

27. Soldiers are but little more than adult children. That officer, therefore, will best perform his duty to his men, who obliges them to take the most care of their HEALTH.

28. Hospitals are the sinks of human life in an army. They robbed the United States of more citizens than the sword. Humanity, economy, and philosophy, all concur in giving a preference to the conveniences and wholesome air of private houses; and should war continue to be the absurd and unchristian mode of deciding national disputes, it is to be hoped that the progress of science will so far mitigate one of its greatest calamities, as to produce an abolition of hospitals for acute diseases. Perhaps there are no cases of sickness, in which reason and religion do not forbid the seclusion of our fellow creatures from the offices of humanity in private families except where they labour under the calamities of madness and the venereal disease, or where they are the subjects of some of the operations of surgery.

* "It is proved, in innumerable instances, that sick men recover health sooner and better in sheds, huts, and barns, exposed occasionally to wind, and sometimes to rain than in the most superb hospitals in Europe." Jackson's Remarks on the Constitution of the Medical Department of the British Army, p. 340.

AN INQUIRY
INTO THE
EFFECTS OF ARDENT SPIRITS
UPON THE
HUMAN BODY AND MIND.
WITH AN
ACCOUNT OF THE MEANS OF PREVENTING,
AND OF
THE REMEDIES FOR CURING THEM.

AN INQUIRY, &c.

BY ardent spirits, I mean those liquors only which are obtained by distillation from fermented substances of any kind. To their effects upon the bodies and minds of men, the following inquiry shall be exclusively confined. Fermented liquors contain so little spirit, and that so intimately combined with other matters, that they can seldom be drunken in sufficient quantities to produce intoxication, and its subsequent effects, without exciting a disrelish to their taste, or pain, from their distending the stomach. They are moreover, when taken in a moderate quantity, generally innocent, and often have a friendly influence upon health and life.

The effects of ardent spirits divide themselves into such as are of a prompt, and such as are of a chronic nature. The former discover themselves in drunkenness, and the latter, in a numerous train of diseases and vices of the body and mind.

I. I shall begin by briefly describing their prompt, or immediate effects in a fit of drunkenness.

This odious disease (for by that name it should be called) appears with more or less of the following symptoms, and most commonly in the order in which I shall enumerate them.

1. Unusual garrulity.
2. Unusual silence.
3. Captiousness, and a disposition to quarrel.
4. Uncommon good humour, and an insipid simpering, or laugh.
5. Profane swearing, and cursing.
6. A disclosure of their own, or other people's secrets.

7. A rude disposition to tell those persons in company, whom they know, their faults.

8. Certain immodest actions. I am sorry to say, this sign of the first stage of drunkenness sometimes appears in women, who, when sober, are uniformly remarkable for chaste and decent manners.

9. A clipping of words.

10. Fighting; a black eye, or a swelled nose, often mark this grade of drunkenness.

11. Certain extravagant acts, which indicate a temporary fit of madness. These are singing, hallooing, roaring, imitating the noises of brute animals, jumping, tearing off clothes, dancing naked, breaking glasses and china, and dashing other articles of household furniture upon the ground, or floor. After a while the paroxysm of drunkenness is completely formed. The face now becomes flushed; the eyes project, and are somewhat watery; winking is less frequent than is natural; the under lip is protruded; the head inclines a little to one shoulder; the jaw falls; belchings and hiccough take place; the limbs totter; the whole body staggers. The unfortunate subject of this history next falls on his seat; he looks around him with a vacant countenance, and mutters inarticulate sounds to himself. He attempts to rise and walk; in this attempt, he falls upon his side, from which he gradually turns upon his back. He now closes his eyes, and falls into a profound sleep, frequently attended with snoring, and profuse sweats, and sometimes with such a relaxation of the muscles which confine the bladder and the lower bowels, as to produce a symptom which delicacy forbids me to mention. In this condition, he often lies from ten, twelve, and twenty-four hours, to two, three, four, and five days, an object of pity and disgust to his family and friends. His recovery from this fit of intoxication is marked with several peculiar appearances. He opens his eyes, and closes them again; he gapes, and stretches his limbs; he then coughs and pukes; his voice is hoarse; he rises with difficulty, and staggers to a chair; his eyes resemble balls of fire; his hands tremble; he loathes the sight of food; he calls for a glass of spirits to compose his stomach; now and then he emits a deep-fetched sigh,

or groan, from a transient twinge of conscience, but he more frequently scolds, and curses every thing around him.

In this state of languor and stupidity he remains for two or three days, before he is able to resume his former habits of business and conversation.

Pythagoras we are told maintained that the souls of men, after death, expiated the crimes committed by them in this world, by animating certain brute animals; and that the souls of those animals, in their turns, entered into men, and carried with them all their peculiar qualities and vices. This doctrine of one of the wisest and best of the Greek philosophers, was probably intended only to convey a lively idea of the changes which are induced in the body and mind of man by a fit of drunkenness. In folly, it causes him to resemble a calf; in stupidity, an ass; in roaring, a mad bull; in quarrelling, and fighting, a dog; in cruelty, a tiger; in fœtor, a skunk; in filthiness, a hog; and in obscenity, a he-goat.

It belongs to the history of drunkenness to remark, that its paroxysms occur, like the paroxysms of many diseases, at certain periods, and after longer or shorter intervals. They often begin with annual, and gradually increase in their frequency, until they appear in quarterly, monthly, weakly, and quotidian or daily periods. Finally, they afford scarcely any marks of remission, either during the day or the night. There was a citizen of Philadelphia, many years ago, in whom drunkenness appeared in this protracted form. In speaking of him to one of his neighbours, I said, "does he not *sometimes* get drunk?" "You mean," said his neighbour, "is he not *sometimes* sober?"

It is further remarkable, that drunkenness resembles certain hereditary, family, and contagious diseases. I have once known it to descend from a father to four out of five of his children. I have seen three, and once four brothers, who were born of sober ancestors, affected by it, and I have heard of its spreading through a whole family composed of members not originally related to each other. These facts are important, and should not be overlooked by parents, in deciding upon the matrimonial connections of their children.

Let us next attend to the chronic effects of ardent spirits upon the body and mind. In the body, they dispose to every form of acute disease; they moreover *excite* fevers

in persons predisposed to them, from other causes. This has been remarked in all the yellow fevers which have visited the cities of the United States. Hard drinkers seldom escape, and rarely recover from them. The following diseases are the usual consequences of the habitual use of ardent spirits, viz.

1. A decay of appetite, sickness at stomach, and a puking of bile, or a discharge of a frothy and viscid phlegm by hawking, in the morning.

2. Obstructions of the liver. The fable of Prometheus, on whose liver a vulture was said to prey constantly, as a punishment for his stealing fire from heaven, was intended to illustrate the painful effects of ardent spirits upon that organ of the body.

3. Jaundice and dropsy of the belly and limbs, and finally of every cavity in the body. A swelling in the feet and legs is so characteristic a mark of habits of intemperance, that the merchants in Charleston, I have been told, cease to trust the planters of South Carolina, as soon as they perceive it. They very naturally conclude industry and virtue to be extinct in that man, in whom that symptom of disease has been produced by the intemperate use of distilled spirits.

4. Hoarseness, and a husky cough, which often terminate in consumption, and sometimes in an acute and fatal disease of the lungs.

5. Diabetes, that is, a frequent and weakening discharge of pale, or sweetish urine.

6. Redness and eruptions on different parts of the body. They generally begin on the nose, and after gradually extending all over the face, sometimes descend to the limbs in the form of leprosy. They have been called "rum-buds," when they appear in the face. In persons who have occasionally survived these effects of ardent spirits on the skin, the face after a while becomes bloated, and its redness is succeeded by a death-like paleness. Thus the same fire which produces a red colour in iron, when urged to a more intense degree, produces what has been called a white heat.

7. A fetid breath, composed of every thing that is offensive in putrid animal matter.

8. Frequent and disgusting belchings. Dr. Haller relates the case of a notorious drunkard having been suddenly destroyed, in consequence of the vapour discharged from his stomach by belching accidentally taking fire, by coming in contact with the flame of a candle.

9. Epilepsy.

10. Gout, in all its various forms of swelled limbs, colic, palsy, and apoplexy.

Lastly, 11. Madness. The late Dr. Waters, while he acted as house pupil and apothecary of the Pennsylvania hospital, assured me, that in one third of the patients confined by this terrible disease it had been induced by ardent spirits.

Most of the diseases which have been enumerated are of a mortal nature. They are more certainly induced, and terminate more speedily in death, when spirits are taken in such quantities, and at such times, as to produce frequent intoxication; but it may serve to remove an error with which some intemperate people console themselves, to remark, that ardent spirits often bring on fatal diseases without producing drunkenness. I have known many persons destroyed by them, who were never completely intoxicated during the whole course of their lives. The solitary instances of longevity which are now and then met with in hard drinkers, no more disprove the deadly effects of ardent spirits, than the solitary instances of recoveries from apparent death by drowning, prove that there is no danger to life from a human body lying an hour or two under water.

The body after its death, from the use of distilled spirits, exhibits by dissection certain appearances which are of a peculiar nature. The fibres of the stomach and bowels are contracted; abscesses, gangrene, and schirri, are found in the viscera; the bronchial vessels are contracted; the blood-vessels and tendons, in many parts of the body, are more or less ossified; and even the hair of the head possesses a crispness, which renders it less valuable to wig-makers than the hair of sober people.

Not less destructive are the effects of ardent spirits upon the human mind. They impair the memory, debilitate the understanding, and pervert the moral faculties. It was probably from observing these effects of intemperance

in drinking upon the mind, that a law was formerly passed in Spain, which excluded drunkards from being witnesses in a court of justice. But the demoralizing effects of distilled spirits do not stop here. They produce not only falsehood, but fraud, theft, uncleanness, and murder. Like the demoniac mentioned in the New Testament, their name is "legion," for they convey into the soul a host of vices and crimes.

A more affecting spectacle cannot be exhibited, than a person into whom this infernal spirit, generated by habits of intemperance, has entered. It is more or less affecting, according to the station the person fills in a family, or in society, who is possessed by it. Is he a husband? How deep the anguish which rends the bosom of his wife! Is she a wife? Who can measure the shame and aversion which she excites in her husband! Is he the father, or is she the mother of a family of children? See their averted faces from their parent, and their blushing looks at each other! Is he a magistrate? or has he been chosen to fill a high and respectable station in the councils of his country? What humiliating fears of corruption in the administration of the laws, and of the subversion of public order and happiness, appear in the countenances of all who see him! Is he a minister of the gospel? Here language fails me.—If angels weep,—it is at such a sight.

In pointing out the evils produced by ardent spirits, let us not pass by their effects upon the estates of the persons who are addicted to them. Are they inhabitants of cities? Behold their houses stripped gradually of their furniture, and pawned, or sold by a constable, to pay tavern debts! see their names upon record in the dockets of every court, and whole pages of newspapers filled with advertisements of their estates for public sale! Are they inhabitants of country places? Behold their houses with shattered windows! their barns with leaky roofs! their gardens over-run with weeds! their fields with broken fences! their hogs without yokes! their sheep without wool! their cattle and horses without fat! and their children filthy, and half clad, without manners, principles, and morals! This picture of agricultural wretchedness is seldom of long duration. The farms and property thus neglected, and depreciated, are seized and sold for the benefit of a group of creditors. The

children that were born with the prospect of inheriting them are bound out to service in the neighbourhood ; while their parents, the unworthy authors of their misfortunes, ramble into new and distant settlements, alternately fed on their way by the hand of charity, or a little casual labour.

Thus we see poverty and misery, crimes and infamy, diseases and death, are all the natural and usual consequences of the intemperate use of ardent spirits.

I have classed death among the consequences of hard drinking. But it is not death from the immediate hand of the Deity, nor from any of the instruments of it which were created by him. It is death from *SUICIDE*. Yes! thou poor degraded creature, who art daily lifting the poisoned bowl to thy lips, cease to avoid the unhallowed ground in which the self-murderer is interred, and wonder no longer that the sun should shine, and the rain fall, and the grass look green, upon his grave. Thou art perpetrating gradually, by the use of ardent spirits, what he has effected suddenly, by opium or a halter. Considering how many circumstances, from a sudden gust of passion, or from derangement, may palliate his guilt, or that (unlike yours) it was not preceded and accompanied by any other crime, it is probable his condemnation will be less than yours at the day of judgment.

I shall now take notice of the occasions and circumstances which are supposed to render the use of ardent spirits necessary, and endeavour to show that the arguments in favour of their use in such cases are founded in error, and that in each of them ardent spirits, instead of affording strength to the body, increase the evils they are intended to relieve.

1. They are said to be necessary in very cold weather, This is far from being true ; for the temporary warmth they produce is always succeeded by a greater disposition in the body to be effected by cold. Warm dresses, a plentiful meal just before exposure to the cold, and eating occasionally a little gingerbread, or any other cordial food, is a much more durable method of preserving the heat of the body in cold weather.

2. They are said to be necessary in very warm weather. Experience proves that they increase instead of lessening the effects of heat upon the body, and thereby dispose to

diseases of all kinds. Even in the warm climate of the West Indies, Dr. Bell asserts this to be true. "Rum (says this author) whether used habitually, moderately, or in excessive quantities, in the West Indies, always diminishes the strength of the body, and renders men more susceptible of disease, and unfit for any service in which vigour or activity is required."* As well might we throw oil into a house, the roof of which was on fire, in order to prevent the flames from extending to its inside, as pour ardent spirits into the stomach, to lessen the effects of a hot sun upon the skin.—

3. Nor do ardent spirits lessen the effects of hard labour upon the body. Look at the horse: with every muscle of his body swelled from morning till night in the plough, or a team, does he make signs for a draught of toddy or a glass of spirits, to enable him to cleave the ground, or to climb a hill? No; he requires nothing but cool water, and substantial food. There is no nourishment in ardent spirits. The strength they produce in labour is of a transient nature, and is always followed by a sense of weakness and fatigue.

But are there no conditions of the human body in which ardent spirits may be given? I answer there are. 1st. When the body has been suddenly exhausted of its strength, and a disposition to faintness has been induced. Here a few spoonful, or a wine glass full of spirits, with or without water, may be administered with safety and advantage. In this case we comply strictly with the advice of Solomon, who restricts the use of "strong drink" only "to him who is ready to perish." 2dly. When the body has been exposed for a long time to wet weather, more especially if it be combined with cold. Here a moderate quantity of spirits is not only safe, but highly proper to obviate debility, and to prevent a fever. They will more certainly have those salutary effects, if the feet are at the same time bathed with them, or a half pint of them poured into the shoes or boots. These I believe are the only two cases, in which distilled spirits are useful or necessary to persons in health.

But it may be said, if we reject spirits from being a part

* Inquiry into the causes which produce, and the means of preventing diseases among British officers, soldiers, and others in the West Indies.

of our drinks, what liquors shall we substitute in their room? I answer, in the first place,

1. **SIMPLE WATER.** I have known many instances of persons, who have followed the most laborious employments for many years in the open air, and in warm and cold weather who never drank any thing but water, and enjoyed uninterrupted good health. Dr. Moseley, who resided many years in the West Indies, confirms this remark. "I aver (says the Doctor) from my own knowledge and custom, as well as the custom and observations of many other people, that those who drink nothing but water, or make it their principal drink, are but little affected by the climate, and can undergo the greatest fatigue without inconvenience, and are never subject to troublesome or dangerous diseases.

Persons who are unable to relish this simple beverage of nature, may drink some one, or all the following liquors, in preference to ardent spirits.

2. **CYDER.** This excellent liquor contains a small quantity of spirit, but so diluted, and blunted, by being combined with a large quantity of saccharine matter, and water, as to be perfectly wholesome. It sometimes disagrees with persons subject to the rheumatism, but it may be made inoffensive to such people, by extinguishing a red hot iron in it, or by mixing it with water. It is to be lamented, that the late frosts in the spring so often deprive us of the fruit which affords this liquor. The effects of these frosts have been in some measure obviated by giving an orchard a north-west exposure, so as to check too early vegetation, and by kindling two or three large fires of brush or straw, to the windward of the orchard, the evening before we expect a night of frost. This last expedient has in many instances preserved the fruit of an orchard, to the great joy and emolument of the ingenious husbandman.

3. **MALT LIQUORS.** The grain from which these liquors are obtained is not liable, like the apple, to be affected by frost and therefore they can be procured at all times, and at a moderate price. They contain a good deal of nourishment; hence we find many of the poor people in Great Britain endure hard labour with no other food than a quart or three pints of beer; with a few pounds of bread in a day. As it will be difficult to prevent small beer from becoming

sour in warm weather, an excellent substitute may be made for it by mixing bottled porter, ale, or strong beer, with an equal quantity of water; or a pleasant beer may be made by adding to a bottle of porter, ten quarts of water, and a pound of brown sugar, or a pint of molasses. After they have been well mixed, pour the liquor into bottles, and place them, loosely corked, in a cool cellar. In two or three days, it will be fit for use. A spoonful of ginger added to the mixture renders it more lively, and agreeable to the taste.

4. **WINES.** These fermented liquors are composed of the same ingredients as cyder, and are both cordial and nourishing. The peasants of France who drink them in large quantities, are a sober and healthy body of people. Unlike ardent spirits, which render the temper irritable, wines generally inspire cheerfulness and good humour. It is to be lamented that the grape has not as yet been sufficiently cultivated in our country, to afford wine to our citizens; but many excellent substitutes may be made for it, from the native fruits of all the states. If two barrels of cyder, fresh, from the press, are boiled into one, and afterwards fermented, and kept for two or three years in a dry cellar, it affords a liquor, which, according to the quality of the apple from which the cyder is made, has the taste of Malaga, or Rhenish wine. It affords when mixed with water, a most agreeable drink in summer. I have taken the liberty of calling it POMONA WINE. There is another method of making a pleasant wine from the apple, by adding four and twenty gallons of new cyder to three gallons of syrup made from the expressed juice of sweet apples. When thoroughly fermented, and kept for a few years, it becomes fit for use. The blackberry of our fields, and the raspberry and currant of our gardens, afford likewise an agreeable and wholesome wine, when pressed and mixed with certain proportions of sugar and water, and a little spirit, to counteract their disposition to an excessive fermentation. It is no objection to these cheap and home-made wines, that they are unfit for use until they are two or three years old. The foreign wines, in common use in our country require not only a much longer time to bring them to perfection, but to prevent their being disagreeable, even to the taste.

5. MOLASSES and WATER, also VINEGAR and WATER, sweetened with sugar or molasses, form an agreeable drink in warm weather. It is pleasant and cooling, and tends to keep up those gentle and uniform sweats, on which health and life often depend. Vinegar and water constituted the only drink of the soldiers of the Roman republic, and it is well known they marched and fought in a warm climate, and beneath a load of arms which weighed sixty pounds. Boaz, a wealthy farmer in Palestine, we find treated his reapers with nothing but bread dipped in vinegar. To such persons as object to the taste of vinegar, sour milk, or butter-milk, or sweet milk diluted with water, may be given in its stead. I have known the labour of the longest and hottest days in summer supported, by means of these pleasant and wholesome drinks, with great firmness, and ended with scarcely a complaint of fatigue.

6. The SUGAR MAPLE affords a thin juice, which has long been used by the farmers in Connecticut as a cool and refreshing drink in the time of harvest. The settlers in the western counties of the middle states will do well to let a few of the trees which yield this pleasant juice remain in all their fields. They may prove the means, not only of saving their children and grand-children many hundred pounds, but of saving their bodies from disease and death, and their souls from misery beyond the grave.

7. COFFEE possesses agreeable and exhilarating qualities, and might be used with great advantage to obviate the painful effects of heat, cold, and fatigue upon the body. I once knew a country physician, who made it a practice to drink a pint of strong coffee previously to his taking a long or cold ride. It was more cordial to him than spirits, in any of the forms in which they are commonly used.

The use of the cold bath in the morning, and of the warm bath in the evening, are happily calculated to strengthen the body in the former part of the day, and to restore it in the latter; from the languor and fatigue which are induced by heat and labour

Let it not be said. ardent spirits have become necessary from habit in harvest, and in other seasons of uncommon and arduous labour. The habit is a bad one, and may be easily broken. Let but half a dozen farmers in a neighbourhood combine to allow higher wages to their labourers

than are common, and a sufficient quantity of *any* of the pleasant and wholesome liquors I have recommended, and they may soon, by their example, abolish the practice of giving them spirits. In a little while they will be delighted with the good effects of their association. Their grain and hay will be gathered into their barns in less time, and in a better condition, than formerly and of course at a less expense than a hundred disagreeable, scenes from sickness, contention and accidents, will be avoided, all of which follow in a greater or less degree the use of ardent spirits.

Nearly all diseases have their predisposing causes. The same thing may be said of the intemperate use of distilled spirits. It will, therefore, be useful to point out the different employments, situations, and conditions of the body and mind, which predispose to the love of those liquors, and to accompany them with directions to prevent persons being ignorantly and undesignedly seduced into the habitual and destructive use of them.

1. Labourers bear with great difficulty long intervals between their meals. To enable them to support the waste of their strength, their stomachs should be constantly, but moderately, stimulated by aliment, and this is best done by their eating four or five times in a day during the seasons of great bodily exertion. The food at this time should be *solid*, consisting chiefly of salted meat. The vegetables used with it should possess some activity, or they should be made savoury by a mixture of spices. Onions and garlic are of a most cordial nature. They composed a part of the diet which enabled the Israelites to endure, in a warm climate, the heavy tasks imposed upon them by their Egyptian masters; and they were eaten, Horace and Virgil tell us, by the Roman farmers, to repair the waste of their strength by the toils of harvest. There are likewise certain sweet substances, which support the body under the pressure of labour. The negroes in the West Indies become strong, and even fat, by drinking the juice of the sugar cane, in the season of grinding it. The Jewish soldiers were invigorated by occasionally eating raisins and figs. A bread composed of wheat flour, molasses, and ginger (commonly called gingerbread) taken in small quantities during the day, is happily calculated to obviate the debility induced upon the body by constant labour. All these substances, whether

of an animal or vegetable nature, lessen the desire, as well as the necessity, for cordial drinks, and impart equable and durable strength to every part of the system.

2. Valetudinarians, especially those who are afflicted with diseases of the stomach and bowels, are very apt to seek relief from ardent spirits. Let such people be cautious how they make use of this dangerous remedy. I have known many men and women of excellent characters and principles, who have been betrayed, by occasional doses of gin and brandy, into a love of those liquors, and have afterwards fallen sacrifices to their fatal effects. The different preparations of opium are much more safe and efficacious than distilled cordials of any kind, in flatulent or spasmodic affections of the stomach and bowels. So great is the danger of contracting a love for distilled liquors, by accustoming the stomach to their stimulus, that as few medicines as possible should be given in spirituous vehicles, in chronic diseases. A physician, of great eminence and uncommon worth, who died towards the close of the last century, in London, in taking leave of a young physician of the city, who had finished his studies under his patronage, impressed this caution with peculiar force upon him, and lamented at the same time, in pathetic terms, that he had innocently made many sots, by prescribing brandy and water in stomach complaints. It is difficult to tell how many persons have been destroyed by those physicians who have adopted Dr. Brown's indiscriminate practice in the use of stimulating remedies, the most popular of which is ardent spirits, but, it is well known, several of them have died of intemperance in this city since the year 1790. They were probably led to it, by drinking brandy and water, to relieve themselves from the frequent attacks of debility and indisposition, to which the labours of a physician expose him, and for which rest, fasting, a gentle purge, or weak diluting drinks, would have been safe and more certain cures.

None of these remarks are intended to preclude the use of spirits in the low state of short, or what are called acute diseases, for, in such cases, they produce their effects too soon to create a habitual desire for them.

3. Some people, from living in countries subject to intermitting fevers, endeavour to fortify themselves against them, by taking two or three wine-glasses of bitters, made

with spirits, every day. There is great danger of contracting habits of intemperance from this practice. Besides, this mode of preventing intermittents is far from being a certain one. A much better security against them, is a tea-spoonful of the jesuits bark, taken every morning during a sickly season. If this safe and excellent medicine cannot be had, a gill or half a pint of a strong watery infusion of centaury, camomile, wormwood, or rue, mixed with a little of the calamus of our meadows, may be taken every morning, with nearly the same advantage as the jesuits bark. Those persons who live in a sickly country, and cannot procure any of the preventives of autumnal fevers which have been mentioned, should avoid the morning and evening air; should kindle fires in their houses, on damp days, and in cool evenings, throughout the whole summer; and put on winter clothes about the first week in September. The last part of these directions applies only to the inhabitants of the middle states.

4. Men who follow professions, which require constant exercise of the faculties of their minds, are very apt to seek relief, by the use of ardent spirits, from the fatigue which succeeds great mental exertions. To such persons, it may be a discovery to know, that TEA is a much better remedy for that purpose. By its grateful and gentle stimulus, it removes fatigue, restores the excitement of the mind, and invigorates the whole system. I am no advocate for the excessive use of tea. When taken too strong, it is hurtful especially to the female constitution; but when taken of a moderate degree of strength and in moderate quantities with sugar and cream, or milk, I believe it is, in general, innoxious, and at all times to be preferred to ardent spirits, as a cordial for studious men. The late Anthony Benezet, one of the most laborious schoolmasters I ever knew, informed me, he had been prevented from the love of spirituous liquors by acquiring a love for tea in early life. Three or four cups, taken in an afternoon, carried off the fatigue of a whole day's labour in his school. This worthy man lived to be seventy one years of age, and died of an acute disease, with the full exercise, of all the faculties of his mind. But the use of tea counteracts a desire for distilled spirits, during great *bodily*, as well as mental exertions. Of this, captain Forest has furnished us with arecent and

remarkable proof, in his History of a Voyage from Calcutta to the Marqui Archipelago. "I have always observed (says this ingenious mariner) when sailors drink TEA, it weans them from the thoughts of drinking strong liquors, and pernicious grog; and with this they are soon contented. Not so with whatever will intoxicate, be it what it will. This has always been my remark. I therefore always encourage it, without their knowing why."

5. Women have sometimes been led to seek relief from what is called breeding sickness, by the use of ardent spirits. A little gingerbread, or biscuit, taken occasionally, so as to prevent the stomach being empty, is a much better remedy for that disease.

6. Persons under the pressure of debt, disappointments in worldly pursuits, and guilt, have sometimes sought to drown their sorrows in strong drink. The only radical cure for those evils is to be found in religion; but where its support is not resorted to, wine and opium should always be preferred to ardent spirits. They are far less injurious to the body and mind than spirits, and the habits of attachment to them are easily broken, after time and repentance have removed the evils they were taken to relieve.

7. The sociable and imitative nature of man often disposes him to adopt the most odious and destructive practices from his companions. The French soldiers who conquered Holland, in the year 1794, brought back with them the love and use of brandy, and thereby corrupted the inhabitants of several of the departments of France, who had been previously distinguished for their temperate and sober manners. Many other facts might be mentioned, to show how important it is to avoid the company of persons addicted to the use of ardent spirits.

8. Smoking and chewing tobacco, by rendering water and simple liquors insipid to the taste, dispose very much to the stronger stimulus of ardent spirits. The practice of smoking segars has, in every part of our country, been more followed by a general use of brandy and water as a common drink, more especially by that class of citizens who have not been in the habit of drinking wine, or malt liquors. The less, therefore, tobacco is used in the above ways, the better.

9. No man ever became suddenly a drunkard. It is by

gradually accustoming the taste and stomach to ardent spirits, in the forms of GROG and TONDY, that men have been led to love them in their more destructive mixtures, and in their simple state. Under the impression of this truth, were it possible for me to speak with a voice so loud as to be heard from the river St. Croix to the remotest shores of the Mississippi, which bound the territory of the United States, I would say, Friends and fellow-citizens, avoid the habitual use of those two seducing liquors, whether they be made with brandy, rum, gin, Jamaica spirits, whiskey, or what is called cherry bounce. It is true, some men, by limiting the strength of those drinks by measuring the spirit and water, have drunken them for many years, and even during a long life, without acquiring habits of intemperance or intoxication, but many more have been insensibly led, by drinking weak toddy and grog first at their meals, to take them for their constant drink, in the intervals of their meals : afterwards to take them, of an increased strength, before breakfast in the morning ; and finally to destroy themselves by drinking undiluted spirits, during every hour of the day and night. I am not singular in this remark. "The consequences of drinking rum and water, or *grog*, as it is called (says Dr. Mosely) is, that habit increases the desire of more spirits, and decreases its effects ; and there are very few grog-drinkers who long survive the practice of debauching with it, without acquiring the odious nuisance of dram-drinkers' breath, and down right stupidity and impotence."* To enforce the caution against the use of those two apparently innocent and popular liquors still further, I shall select one instance, from among many, to show the ordinary manner in which they beguile and destroy their votaries. A citizen of Philadelphia, once of a fair and sober character, drank toddy for many years, as his constant drink. From this he proceeded to drink grog. After a while nothing would satisfy him but slings made of equal parts of rum and water, with a little sugar. From slings he advanced to raw rum, and from common rum to Jamaica spirits. Here he rested for a few months, but at length, finding even Jamaica spirits were not strong enough to warm his stomach, he made it a constant practice to throw a table-spoonful of

* Treatise on Tropical diseases.

ground pepper in each glass of his spirits, in order to use his own words, "to take off their coldness." He soon after died a martyr to his intemperance.

Ministers of the gospel, of every denomination, in the United States! aid me with all the weight you possess in society, from the dignity and usefulness of your sacred office, to save our fellow men from being destroyed by the great destroyer of their lives and souls. In order more successfully to effect this purpose, permit me to suggest to you to employ the same wise modes of instruction, which you use in your attempts to prevent their destruction by other vices. You expose the evils of covetousness, in order to prevent theft; you point out the sinfulness of impure desires, in order to prevent adultery; and you dissuade from anger, and malice, in order to prevent murder. In like manner, denounce by your preaching, conversation, and examples, the seducing influence of toddy and grog, when you aim to prevent all the crimes and miseries which are the offspring of strong drink.

We have hitherto considered the effects of ardent spirits upon individuals, and the means of preventing them. I shall close this head of our inquiry, by a few remarks upon their effects upon the population and welfare of our country, and the means of obviating them.

It is highly probable not less than 4000 people die annually, from the use of ardent spirits, in the United States. Should they continue to exert this deadly influence upon our population, where will their evils terminate? This question may be answered, by asking, where are all the Indian tribes, whose numbers and arms formerly spread terror among their civilized neighbours? I answer, in the words of the famous Mingo chief, "the blood of many of them flows not in the veins of any human creature." They have perished, not by pestilence, nor war, but by a greater foe to human life than either of them—ardent spirits. The loss of 4000 American citizens, by the yellow fever, in a single year, awakened general sympathy and terror, and called forth all the strength and ingenuity of laws, to prevent its recurrence. Why is not the same zeal manifested in protecting our citizens from the more general and consuming ravages of distilled spirits? Should the customs of civilized life preserve our nation from extinction and

even from an increase of mortality, by those liquors; they cannot prevent our country being governed by men, chosen by intemperate and corrupted voters. From such legislators, the republic would soon be in danger. To avert this evil, let good men of every class unite, and besiege the general and state governments with petitions to limit the number of taverns; to impose heavy duties upon ardent spirits; to inflict a mark of disgrace, or a temporary abridgment of some civil right, upon every man convicted of drunkenness; and finally to secure the property of habitual drunkards, for the benefit of their families, by placing it in the hands of trustees, appointed for that purpose by a court of justice.

To aid the operation of these laws, would it not be extremely useful for the rulers of the different denominations of christian churches to unite, and render the sale and consumption of ardent spirits a subject of ecclesiastical jurisdiction? The methodists, and society of friends, have, for some time past, viewed them as contraband articles to the pure laws of the gospel, and have borne many public and private testimonies against making them the objects of commerce. Their success in this benevolent enterprise, affords ample encouragement for all other religious societies to follow their example.

We come now to the THIRD part of this inquiry, that is, to mention the remedies for the evils which are brought on by the excessive use of distilled spirits.

These remedies divide themselves into two kinds.

I. Such as are proper to cure a fit of drunkenness, and,—

II. Such as are proper to prevent its recurrence and to destroy a desire for ardent spirits.

I. I am aware that the efforts of science and humanity, in applying their resources to the cure of a disease induced by an act of vice, will meet with a cold reception from many people. But let such people remember, the subjects of our remedies are their fellow creatures, and that the miseries brought upon human nature, by its crimes, are as much the objects of divine compassion (which we are bound to imitate) as the distresses which are brought upon men by the crimes of other people, or which they bring upon themselves by ignorance or accidents. Let us not then pass by the prostrate sufferer from strong drink, but

administer to him the same relief we would afford to a fellow creature, in a similar state, from an accidental, and innocent cause.

1. The first thing to be done to cure a fit of drunkenness, is to open the collar, if in a man, and remove all tight ligatures from every other part of the body. The head and shoulders should at the same time be elevated, so as to favour a more feeble determination of the blood to the brain.

2. The contents of the stomach should be discharged, by thrusting a feather down the throat. It often restores the patient immediately to his senses and feet. Should it fail of exciting a puking—

3. A napkin should be wrapped round the head, and wetted for an hour or two with cold water, or cold water should be poured in a stream upon the head. In the latter way I have sometimes seen it used, when a boy, in the city of Philadelphia. It was applied, by dragging the patient, when found drunk in the street, to a pump, and pumping water upon his head for ten or fifteen minutes. The patient generally rose, and walked off, sober and sullen, after the use of this remedy.

Other remedies, less common but not less effectual for a fit of drunkenness, are—

4. Plunging the whole body into cold water. A number of gentlemen who had drunken to intoxication, on board a ship in the stream, near Fell's point, at Baltimore, in consequence of their reeling in a small boat, on their way to the shore, in the evening, upset it, and fell into the water. Several boats from the shore hurried to their relief. They were all picked up, and went home, perfectly sober to their families.

5. Terror. A number of young merchants who had drunken together, in a counting-house, on James river, above thirty years ago, until they were intoxicated, were carried away by a sudden rise of the river, from an immense fall of rain. They floated several miles with the current, in their little cabin, half filled with water. An island in the river arrested it. When they reached the shore that saved their lives, they were all sober. It is probable terror assisted in the cure of the persons who fell into the water at Baltimore.

6. The excitement of a fit of anger. The late Dr Witherspoon used to tell a story of a man in Scotland, who was always cured of a fit of drunkenness by being made angry. The means chosen for that purpose was a singular one. It was talking against religion.

7. A severe whipping. This remedy acts by exciting a revulsion of the blood from the brain to the external parts of the body.

8. Profuse sweats. By means of this evacuation, nature sometimes cures a fit of drunkenness. Their good effects are obvious in labourers, whom quarts of spirits taken in a day will seldom intoxicate while they sweat freely. If the patient be unable to swallow warm drinks, in order to produce sweats, they may be excited by putting him in a warm bath, or wrapping his body in blankets, under which should be placed half a dozen hot bricks, or bottles filled with hot water.

9. Bleeding. This remedy should always be used, when the former ones have been prescribed to no purpose, or where there is reason to fear, from the long duration of the disease, a material injury may be done to the brain.

It is hardly necessary to add, that each of the above remedies should be regulated by the grade of drunkenness, and the greater or less degree in which the intellects are affected in it.

II. The remedies which are proper to prevent the recurrence of fits of drunkenness, and to destroy the desire for ardent spirits, are religious, metaphysical, and medical. I shall briefly mention them.

1. Many hundred drunkards have been cured of their desire for ardent spirits, by a practical belief in the doctrines of the christian religion. Examples of the divine efficacy of christianity for this purpose have lately occurred in many parts of the United States.

2. A sudden sense of the guilt contracted by drunkenness, and of its punishment in a future world. It once cured a gentleman in Philadelphia, who, in a fit of drunkenness, attempted to murder a wife whom he loved. Upon being told of it when he was sober, he was so struck with the enormity of the crime he had nearly committed, that he never tasted spirituous liquors afterwards.

3. A sudden sense of shame. Of the efficacy of this

deep seated principle in the human bosom, in curing drunkenness I shall relate three remarkable instances.

A farmer in England, who had been many years in the practice of coming home intoxicated, from a market town, one day observed appearances of rain, while he was in market. His hay was cut, and ready to be housed. To save it, he returned in haste to his farm, before he had taken his customary dose of grog. Upon coming into his house, one of his children, a boy of six years old, ran to his mother, and cried 'out, "O, mother! father is come home, and he is not drunk." The father, who heard this exclamation, was so severely rebuked by it, that he suddenly became a sober man.

A noted drunkard was once followed by a favourite goat to a tavern, into which he was invited by his master, and drenched with some of his liquor. The poor animal staggered home with his master, a good deal intoxicated. The next day he followed him to his accustomed tavern. When the goat came to the door, he paused: his master made signs to him to follow him into the house. The goat stood still. An attempt was made to thrust him into the tavern. He resisted, as if struck with the recollection of what he suffered from being intoxicated the night before. His master was so much affected by a sense of shame, in observing the conduct of his goat to be so much more rational than his own, that he ceased from that time to drink spirituous liquors.

A gentleman, in one of the southern states, who had nearly destroyed himself by strong drink, was remarkable for exhibiting the grossest marks of folly in his fits of intoxication. One evening, sitting in his parlour, he heard an uncommon noise in his kitchen. He went to the door, and peeped through the key hole, from whence he saw one of his negroes diverting his fellow servants, by mimicking his master's gestures and conversation when he was drunk. The sight overwhelmed him with shame and distress, and instantly became the means of his reformation.

4. The association of the idea of ardent spirits with a painful or disagreeable impression upon some part of the body, has sometimes cured the love of strong drink. I once tempted a negro man, who was habitually fond of

ardent spirits, to drink some rum (which I placed in his way) and in which I had put a few grains of tartar emetic. The tartar sickened and puked him to such a degree, that he supposed himself to be poisoned. I was much gratified by observing he could not bear the sight, nor smell, of spirits for two years afterwards.

I have heard of a man who was cured of the love of spirits, by working off a puke by large draughts of brandy and water, and I know a gentleman, who in consequence of being affected with a rheumatism, immediately after drinking some toddy, when overcome with fatigue and exposure to the rain, has ever since loathed that liquor, only because it was accidentally associated in his memory with the recollection of the pain he suffered from his disease.

This appeal to that operation of the human mind, which obliges it to associate ideas, accidentally or otherwise combined, for the cure of vice, is very ancient. It was resorted to by Moses, when he compelled the children of Israel to drink the solution of the golden calf (which they had idolized) in water. This solution, if made, as it most probably was, by means of what is called *hepar sulphuris*, was extremely bitter, and nauseous, and could never be recollected afterwards, without bringing into equal detestation the sin which subjected them to the necessity of drinking it. Our knowledge of this principle of association upon the minds and conduct of men should lead us to destroy, by means of other impressions, the influence of all those circumstances, with which the recollection and desire of spirits are combined. Some men drink only in the *morning*, some at *noon*, and some only at *night*. Some men drink only on a *market day*, some at *one* tavern only, and some only in *one kind* of company. Now by finding a new and interesting employment or subject of conversation for drunkards, at the usual times in which they have been accustomed to drink, and by restraining them by the same means from those places and companions, which suggested to them the idea of ardent spirits, their habits of intemperance may be completely destroyed. In the same way the periodical returns of appetite, and a desire of sleep, have been destroyed in a

hundred instances. The desire for strong drink differs from each of them, in being of an artificial nature, and therefore not disposed to return, after being chased for a few weeks from the system.

5. The love of ardent spirits has sometimes been subdued, by exciting a counter passion in the mind. A citizen of Philadelphia had made many unsuccessful attempts to cure his wife of drunkenness. At length, despairing of her reformation, he purchased a hogshead of rum, and, after tapping it, left the key in the door of the room in which it was placed, as if he had forgotten it. His design was to give his wife an opportunity of drinking herself to death. She suspected this to be his motive, in what he had done, and suddenly left off drinking. Resentment here became the antidote to intemperance.

6. A diet consisting wholly of vegetables cured a physician in Maryland of drunkenness, probably by lessening that thirst, which is always more or less excited by animal food.

7. Blisters to the ankles, which were followed by an unusual degree of inflammation, once suspended the love of ardent spirits, for one month, in a lady in this city. The degrees of her intemperance may be conceived of, when I add, that her grocer's account for brandy alone amounted, annually, to one hundred pounds, Pennsylvania currency, for several years.

8. A violent attack of an acute disease has sometimes destroyed a habit of drinking distilled liquors. I attended a notorious drunkard, in the yellow fever in the year 1798, who recovered, with the loss of his relish for spirits, which has, I believe, continued ever since.

9. A salivation has lately performed a cure of drunkenness, in a person in Virginia. The new disease excited in the mouth and throat, while it rendered the action of the smallest quantity of spirits upon them painful, was happily calculated to destroy the diseases in the stomach which prompts to drinking, as well as to render, the recollection of them disagreeable, by the laws of association formerly mentioned.

10. I have known an oath, taken before a magistrate, to drink no more spirits, produce a perfect cure of drun-

kenness. It is sometimes cured in this way in Ireland. Persons who take oaths for this purpose are called affidavit men.

11. An advantage would probably arise from frequent representations being made to drunkards, not only of the certainty, but of the *suddenness* of death, from habits of intemperance. I have heard of two persons being cured of the love of ardent spirits, by seeing death suddenly induced by fits of intoxication; in the one case, in a stranger, and in the other, in an intimate friend.

12. It has been said, that the disuse of spirits should be gradual, but my observations authorise me to say, that persons who have been addicted to them should abstain from them *suddenly*, and *entirely*. "Taste not, handle not, touch not," should be inscribed upon every vessel that contains spirits, in the house of a man who wishes to be cured of habits of intemperance. To obviate, for awhile, the debility which arises from the sudden abstraction of the stimulus of spirits, laudanum, or bitters infused in water, should be taken, and perhaps a larger quantity of beer or wine, than is consistent with the strict rules of temperate living. By the temporary use of these substitutes for spirits, I have never known the transition to sober habits to be attended with any bad effects, but often with permanent health of body, and peace of mind.

OBSERVATIONS
UPON
THE TETANUS.

VOL. I

Z



OBSERVATIONS, &c.

FOR a history of the different names and symptoms of this disease, I beg leave to refer the reader to practical books, particularly to Dr. Cullen's First Lines. My only design in this inquiry is, to deliver such a theory of the disease, as may lead to a new and successful use of old and common remedies for it.

All the remote and predisposing causes of the tetanus act by inducing preternatural debility, and irritability in the muscular parts of the body. In many cases, the remote causes act alone, but they more frequently require the co-operation of an exciting cause. I shall briefly enumerate, without discriminating them, or pointing out when they act singly, or when in conjunction with each other.

I. Wounds on different parts of the body are the most frequent causes of this disease. It was formerly supposed it was the effect only of a wound, which partially divided a tendon or a nerve; but we now know it is often the consequence of læsions which affect the body in a superficial manner. The following is a list of such wounds and læsions as have been known to induce the disease :

1. wounds in the soles of the feet, in the palms of the hands, and under the nails, by means of nails or splinters of wood.
2. Amputations, and fractures of limbs.
3. Gun-shot wounds.
4. Venesection.
5. The extraction of a tooth, and the insertion of new teeth.

6. The extirpation of a schirrus.
7. Castration.
8. A wound on the tongue.
9. The injury which is done to the feet by frost.
10. The injury which is sometimes done to one of the toes, by stumping it (as it is called) in walking.
11. Cutting a nail too closely. Also a
12. Cutting a corn too closely.
13. Wearing a shoe so tight as to abrade the skin of one of the toes.
14. A wound, not more than an eighth part of an inch, upon the forehead.
15. The stroke of a whip upon the arm, which only broke the skin.
16. Walking too soon upon a broken limb.
17. The sting of a wasp upon the glands penis.
18. A fish bone sticking in the throat.
19. Cutting the navel string in new-born infants.

Between the time in which the body is thus wounded or injured, and the time in which the disease makes its appearance, there is an interval, which extends from one day to six-weeks. In the person who injured his toe by stumping it in walking, the disease appeared the next day. The trifling wound on the forehead which I have mentioned, produced both tetanus and death, the day after it was received. I have known two instances of tetanus, from running nails in the feet, which did not appear until six weeks afterwards. In most of the cases of this disease from wounds, which I have seen, there was a total absence of pain and inflammation, or but very moderate degrees of them, and in some of them the wounds had entirely healed, before any of the symptoms of the disease had made their appearance. Wounds and læsions are most apt to produce tetanus, after the long continued application of heat to the body; hence its greater frequency, from these causes, in warm than in cold climates, and in warm than in cold weather, in northern countries.

II. Cold applied suddenly to the body, after it has been exposed to intense heat. Of this Dr. Girdlestone mentions many instances, in his Treatise upon Spasmodic Affections in India. It was most commonly induced by

sleeping upon the ground, after a warm day. Such is the dampness and unwholesome nature of the ground, in some parts of that country, that "fowls (the Doctor says) put into coops at night, in the sickly season of the year, and on the same soil that the men slept, were always found dead the next morning, if the coop was not placed at a certain height above the surface of the earth"* It was brought on by sleeping on a damp pavement in a servant girl of Mr. Alexander Todd, of Philadelphia, in the evening of a day in which the mercury in Fahrenheit's thermometer stood at 90°. Dr. Chalmers relates an instance of its having been induced by a person's sleeping without a nightcap, after shaving his head. The late Dr. Bartram informed me, that he had known a draught of cold water produce it in a man who was in a preternaturally heated state. The cold air more certainly brings on this disease, if it be applied to the body in the form of a current. The stiff neck, which is sometimes felt after exposure to a stream of cool air from an open window, is a tendency to a locked jaw, or a feeble and partial tetanus.

III. Worms and certain acrid matters in the alimentary canal. Morgagni relates an instance of the former, and I shall hereafter mention instances of the latter in new-born infants.

IV. Certain poisonous vegetables. There are several cases upon record of its being induced by the hemlock dropwort, and the datura stramonium, or Jamestown weed, of our country.

V. It is sometimes a symptom of the bilious remitting and intermitting fever. It is said to occur more frequently in those states of fever in the island of Malta, than in any other part of the world.

VI. It is likewise a symptom of that malignant state of fever which is brought on by the bite of a rabid animal, also of hysteria and gout.

VII. The grating noise produced by cutting with a knife upon a pewter plate excited it in a servant, while he was waiting upon his master's table in London. It proved fatal in three days.

VIII. The sight of food after long fasting.

IX. Drunkenness.

X. Certain emotions and passions of the mind. 'Terror' brought it on a brewer in this city. He had been previously debilitated by great labour, in warm weather. I have heard of its having been induced in a man by agitation of mind, occasioned by seeing a girl tread upon a nail. Fear excited it in a soldier who kneeled down to be shot. Upon being pardoned he was unable to rise, from a sudden attack of tetanus. Grief produced it in a case mentioned by Dr. Willan.

XI. Parturition.

All these remote and exciting causes act with more or less certainty and force, in proportion to the greater or less degrees of fatigue which have preceded them.

It has been customary with authors to call all those cases of tetanus, which are not brought on by wounds, symptomatic. They are no more so than those which are said to be idiopathic. They all depend alike upon irritating impressions made upon one part of the body, producing morbid excitement, or disease in another. It is immaterial, whether the impression be made upon the intestines by a worm, upon the ear by an ungrateful noise, upon the mind by a strong emotion, or upon the sole of the foot by a nail; it is alike communicated to the muscles, which, from their previous debility and irritability, are thrown into commotions by it. In yielding to the impression of irritants, they follow in their contractions the order of their predisposing debility. The muscles which move the lower jaw are affected more early, and more obstinately, than any of the other external muscles of the body, only because they are more constantly in a relaxed, or idle, state.

The negroes in the West Indies are more subject to this disease than white people. This has been ascribed to the greater irritability of their muscular systems, which constitutes a part of its predisposing cause. It is remarkable that their sensibility lessens with the increase of their irritability; and hence, Dr. Mosely says, they bear surgical operations much better than white people.

The new-born infants of the negroes in the West Indies are often affected with this disease, among whom it is

known by the name of the jaw-fall. Dr. Dazille says, that during a residence of thirty years in the islands, and chiefly at St. Domingo, he saw but one instance of it in a white child. It is said one-tenth of all the negro children that are born in the west Indies, die of it. Local circumstances influence its mortality. Nineteen out of twenty black children, Dr. Gordon informed me, in his visit to Philadelphia in the summer of 1806, died upon a plantation in Berbice, while upon a neighbouring plantation not a single instance of death had ever occurred from it. Dr. Cleghorn informs us that it is a common disease among the white children in Minorca.* I have seen a few cases of it in the children of white persons in Philadelphia. Its causes are,

1. The cutting of the navel-string. This is often done with a pair of dull scissors, by which means the cord is bruised.

2. The acrimony of the meconium retained in the bowels.

3. Cold air acting upon the body, after it had been heated by the air of a hot room.

4. Smoke is supposed to excite it in the negro quarters in the West Indies. Perhaps this, and the preceding cause induced the great mortality of the disease upon the plantation in Berbice, mentioned by Dr. Gordon.

It is unknown, Dr. Winterbottom informs us, among the native Africans in the neighbourhood of Sierra Leone.

I am aware that it is ascribed by many physicians to only one of the above causes; but I see no reason why it should not be induced by more than one cause in infants, when we see it brought on by so many different causes in grown people.

The tetanus is not confined to the human species. It often affects horses in the West Indies. I have seen several cases of it in Philadelphia. I have likewise seen it appear in the form of opisthotinos in a pigeon, brought on by a wound in one of its wings.

The want of uniform success in the treatment of this disease has long been a subject of regret among physicians. It may be ascribed to the use of the same reme-

* Diseases of Minorca, p. 46. Philadelphia Edition.

dies, without any respect to the nature of the causes which produce it, and to an undue reliance upon some one remedy, under a belief of its specific efficacy. Opium has been considered as its antidote, without recollecting that it was one only, of a numerous class of medicines, that are all alike useful in it.

Tetanus, from all its causes, has nearly the same premonitory symptoms. These are, a stiffness in the neck, a disposition to bend forward, in order to relieve a pain in the back, costiveness, a pain about the external region of the stomach, and a disposition to start in sleep. In this feeble state of the disease, an emetic, a strong dose of laudanum, the warm bath, or a few doses of bark, have often prevented its being completely formed. When it has arisen from a wound, dilating it, if small or healed, and afterwards inflaming it, by applying to it turpentine, common salt, corrosive sublimate, or Spanish flies, have, in many hundred instances, been attended with the same salutary effects.

The disease I have said is seated in the muscles, and, while they are preternaturally excited, the blood-vessels are in a state of reduced excitement: This is evident from the feebleness and slowness of the pulse, and the feeble coherence, or total dissolution, of the blood. The pulse sometimes beats, according to Dr. Lining, but forty strokes in a minute. By stimulating the wound, we not only restore the natural excitement of the blood-vessels, but we produce an inflammatory diathesis in them, which abstracts morbid excitement from the muscular system, and, by equalizing it, cures the disease. This remedy, I acknowledge, has not been as successfully employed in the West Indies as in the United States, and that for an obvious reason. The blood-vessels in a warm climate refuse to assume an inflammatory action. Stimuli hurry them on suddenly to torpor or gangrene. This is so uniformly the case, that Dr. Dazille not only forbids their application to recent wounds, but advises the most lenient applications to them.* But widely different is the nature of wounds, and of the tension of the blood-vessels, in the inhabitants of northern countries. While Dr. Dallas deplores the loss

* Observations sur le Tetanos, p. 326.

of 49 out of 50 affected with tetanus from wounds, in the West India islands, I am sure I could mention many hundred instances of the disease being prevented, and a very different proportion of cures being performed, by inflaming the wounds, and exciting a counter *morbid* action in the blood-vessels.

This disease like many others has its anomalies. I have seen it attended with a complete intermission of spasms, and a total relaxation of all the muscles which are usually affected by it, and in one instance I have observed the spasms to be confined exclusively to one side of the body. I have likewise met with a case in a black girl, in whom all the symptoms of the disease occurred, except a trismus or a contraction of the jaw. The force of the disease in that part of her body spent itself upon her tongue. She lost the power of speech. The disease was brought on by a wound in her hand. She was cured by tonic remedies.

When the disease is the effect of fever, the same remedies should be given, as are employed in the cure of that fever. I have once unlocked the jaw of a woman, who was seized at the same time with a remitting fever, by an emetic, and I have heard of its being cured in a company of surveyors, in whom it was the effect of an intermittent, by large doses of bark. When it accompanies malignant fevers, hysteria, or gout, the remedies for those forms of disease should be employed. Bleeding was highly useful in it, in a case of yellow fever which occurred in Philadelphia in the year 1794.

When it is produced by the suppression of perspiration by means of cold, the warm bath and sweating medicines have been found most useful in it. Nature has in one instance pointed out the use of this remedy, by curing the disease by a miliary eruption on the skin *

If it be the effect of poisonous substances taken into the stomach, or of worms in the bowels, the cure should be begun by emetics, purges, and anthelmintic medicines.

Where patients are unable to swallow, from the teeth of the upper and lower jaw pressing upon each other, a tooth or two should be extracted, to open a passage for

* Burserus.

our medicines into the throat. If this be impracticable, or objected to, they should be injected by way of glyster.

In the locked jaw which arises from the extraction of a tooth, an instrument should be introduced to depress the jaw. This has been done by a noted English dentist in London, with success.

As the habit of diseased action often continues after the removal of its causes, and as some of the remote causes of this disease are beyond the reach of medicine, such remedies should be given as are calculated, by their stimulating power, to overcome the morbid or spasmodic action of the muscles. These are :

1. **OPIUM.** It should be given in large and frequent doses. Dr. Streltz says he has found from one to two drachms of an alkali, taken in the course of a day, greatly to aid the action of the opium in this disease.

Dr. Dazille advises the exhibition of opium in glysters, and speaks in high terms of the efficacy of a plaister composed of three drachms of opium and a dram of camphor finely powdered, and applied to the sole of each foot, in the tetanus of the West Indies.*

2. **WINE.** This should be given in quarts, and even gallons daily. Dr. Currie relates a case of a man in the infirmary of Liverpool, who was cured of tetanus, by drinking nearly a quarter cask of Madeira wine. Dr. Hosack speaks in high terms of it, in a letter to Dr. Duncan, and advises its being given without any other stimulating medicine.

3. **ARDENT SPIRITS.** A quack in New England has lately cured tetanus, by giving ardent spirits in such quantities as to produce intoxication. Upon being asked his reason for this strange practice, he said he had always observed the jaw to fall in drunken men, and any thing that would produce that effect, he supposed to be proper in the locked jaw.

4. The **BARK** has of late years been used in this disease with success. I had the pleasure of first seeing its good effects in the case of colonel Stone, in whom a severe tetanus followed a wound in the foot, received at the battle of Germantown, in October, 1777.

* Observations sur le Tetanus, p. 286 and 300.

5. The **COLD BATH**. This remedy has been revived by Dr. Wright of Jamaica, and has in many instances performed cures of this disease. In one of two cases in which I have used it with success, the patient's jaw opened in a few minutes after the affusion of a single bucket of water upon her body. The disease was occasioned by a slight injury done to one of her toes, by wearing a tight shoe. The signals for continuing the use of the cold bath are, its being followed by a slight degree of fever, and a general warmth of the skin. Where these do not occur, there is reason to believe it will do no service, or perhaps do harm. We have many proofs of the difference in the same disease, and in the operations of the same medicine, in different and opposite climates. Dr. Girdlestone has mentioned the result of the use of the cold bath in tetanus in the East Indies, which furnishes a striking addition to the numerous facts that have been collected upon that subject. He tells us the cold bath uniformly destroyed life, in every case in which it was used. The reason is obvious. In that extremely debilitating climate, the system in tetanus was prostrated too low, to re-act under the sedative operation of the cold water.

6. The **WARM BATH** has often been used with success in this disease. Its temperature should be regulated by our wishes to promote sweats, or to produce excitement in the blood vessels. In the latter case it should rise above the heat of the human body.

7. The **OIL OF AMBER** acts powerfully upon the muscular system. I have seen the happiest effects from the exhibition of six or eight drops of it, every two hours, in this disease.

8. A **SALIVATION** has been often recommended for the cure of tetanus, but unfortunately it can seldom be excited in time to do service. I once saw it complete the cure of a sailor in the Pennsylvania hospital, whose life was prolonged by the alternate use of bark and wine. The disease was brought on him by a mortification of his feet, in consequence of their being frost bitten.

9. Dr. Girdlestone commends **BLISTERS** in high terms in this disease. He says he never saw it prove fatal, even where they only produced a redness on the skin.

10. I have heard of **ELECTRICITY** having been used with advantage in tetanus, but I can say nothing in its favour from my own experience.

In order to ensure the utmost benefit from the use of the above remedies, it will be necessary for a physician always to recollect, that the disease is attended with great morbid action, and of course each of the stimulating medicine- that has been mentioned should be given, 1st, in large doses; 2dly, in succession; 3dly, in rotation; and 4thly, by way of glyster, as well as by the mouth.

The jaw-fall in new-born infants is, I believe, always fatal. Purging off the meconium from the bowels immediately after birth has often prevented it from one of its causes; and applying a rag wetted with spirit of turpentine to the navel-string, immediately after it is cut, Dr. Chisholm says, prevents it from another of its causes which has been mentioned. Dr Dazille says it is prevented by the Indians, in the neighbourhood of Cayenne, by anointing their children daily, for nine days after their birth, with sweet oil.

This disease, I have said, sometimes affects horses. I have twice seen it cured by applying a potential caustic to the neck, under the mane, by large doses of the oil of amber, and by plunging one of them into a river, and throwing buckets of cold water upon the other. It was cured in the pigeon formerly mentioned, by two grains of opium administered in the form of a pill.

I shall conclude my observations upon the tetanus with the following queries:

1. What would be the effects of *copious* blood-letting in this disease? There is a case upon record of its efficacy, in the Medical Journal of Paris, and I have now in my possession a letter from the late Dr. Hopkins of Connecticut, containing the history of a cure performed by it. Where tetanus is the effect of primary gout, hysteria, or fever, attended with highly inflammatory symptoms, bleeding is certainly indicated, in order to prevent the blood-vessels opposing their force to the action of tonics, and to place them in a minus or craving state of excitement. By means of this remedy employed *once* in the case of Mrs. Coates, at Kensington, and *twice* in the case

of Miss Germon, in Swanson street, I was enabled to cure the disease in both of them. It was brought on by a corn in the former, and by a wound in the latter instance. The blood of Miss Germon was very sizy. In general, however, the disease is so completely insulated in the muscles, and the arteries are so far below their par of excitement in frequency and force, that little benefit can be expected from that remedy. The disease, in these cases, seems to call for an elevation, instead of a diminution, of the excitement of the blood-vessels. Perhaps bleeding ad deliquium animi might so far relax the muscles, as to enable the blood-vessels and other parts of the body to abstract from them their agreeable and natural portions of excitement. It is certain the muscles of a horse in a tetanus become relaxed the instant he dies. By inducing this relaxation, in the manner that has been mentioned, before the relations of the different systems of the body to each other are weakened and dissolved, it is possible the disease might be cured.

2. What would be the effect of *extreme* cold in this disease? Mr. John Hunter used to say, in his lectures, "Were he to be attacked by it, he would if possible, fly to Nova-Zembla, or throw himself into an ice-house." I have no doubts of the efficacy of intense cold, in subduing the inordinate morbid actions which occur in the muscular system; but it offers so much violence to the fears and prejudices of sick people, or their friends, that it can seldom be applied in such a manner as to derive much benefit from it. Perhaps the sedative effects of cold might be obtained with less difficulty, by wrapping the body in sheets, and wetting them occasionally for an hour or two with cold water.

3. What would be the effect of exciting a strong counteraction in the stomach and bowels in this disease? Dr. Brown of Kentucky cured a tetanus by inflaming the stomach, by means of the tincture of cantharides. It has likewise been cured by a severe cholera morbus, induced by a large dose of corrosive sublimate. The stomach and bowels, and the external muscles of the body, discover strong associations in many diseases. A sick stomach is always followed by general weakness, and the dry gripes

often paralyze the muscles of the arms and limbs. But further, one of the remote causes of tetanus, viz. cold air, often shows the near relationship of the muscles to the bowels, and the vicarious nature of disease in each of them. It often produces in the latter, in the West Indies, what the French Physicians call a "crampe seche," or, in other words, if I may be allowed the expression, a tetanus in the bowels.

4. A sameness has been pointed out between many of the symptoms of hydrophobia and tetanus. A similar difficulty of swallowing, and similar convulsions after it, have been remarked in both diseases. Death often takes place suddenly in tetanus, as it does in hydrophobia, without producing marks of fatal disorganization in any of the internal parts of the body. Dr. Physick supposes death in these cases to be the effect of suffocation, from a sudden spasm and closure of the glottis, and proposes to prevent it in the same manner that he has proposed to prevent death from hydrophobia, that is, by laryngotomy.* The prospect of success from it appears alike reasonable in both cases.

* Medical Repository.

AN ACCOUNT
OF
THE DISEASE OCCASIONED
BY
DRINKING COLD WATER
IN WARM WEATHER,
AND THE METHOD OF CURING IT.

AN ACCOUNT, &c.

FEW summers elapse in Philadelphia, in which there are not instances of many persons being diseased by drinking cold water. In some seasons, four or five persons have died suddenly from this cause in one day. This mortality falls chiefly upon the labouring part of the community, who seek to allay their thirst by drinking the water from the pumps in the streets, and who are too impatient, or too ignorant, to use the necessary precautions for preventing its morbid or deadly effects upon them. These accidents seldom happen, except when the mercury rises above 85° in Fahrenheit's thermometer.

Three circumstances generally concur to produce disease or death, from drinking cold water. 1. The patient is extremely warm. 2. The water is extremely cold. And 3. A large quantity of it is suddenly taken into the body. The danger from drinking the cold water is always in proportion to the degrees of combination which occur in the three circumstances that have been mentioned.*

The following symptoms generally follow, where cold water has been taken, under the above circumstances, into the body :

In a few minutes after the patient has swallowed the water, he is affected by a dimness of sight ; he staggers, in attempting to walk, and unless supported, falls to the

* Dr. Currie has supposed in his Medical Reports, that the persons who are thus affected by drinking cold water are in a state of debility from the long continued action of heat upon their bodies ; but this is not the case. They are generally in a state of very high excitement. The Doctor's mistake is founded upon an erroneous belief, that the skin and the stomach possess a similar susceptibility to the action of cold water.

ground; he breathes with difficulty; a rattling is heard in his throat; his nostrils and cheeks expand and contract in every act of respiration; his face appears suffused with blood, and of a livid colour, his extremities become cold, and his pulse imperceptible; and, unless relief be speedily obtained, the disease terminates in death, in four or five minutes.

This description includes only the less common cases of the effects of drinking a *large* quantity of *cold* water, when the body is *preternaturally* heated. More frequently, patients are seized with acute spasms in the breast and stomach. These spasms are so painful as to produce syncope, and even asphyxia. They are sometimes of the tonic but more frequently of the clonic kind. In the intervals of the spasms, the patient appears to be perfectly well. The intervals between each spasm become longer or shorter, according as the disease tends to life or death.

It may not be improper to take notice, that punch, beer, and even toddy, when drunken under the same circumstances as cold water, have all been known to produce the same morbid and fatal effects.

I know of but one certain remedy for this disease, and that is LIQUID LAUDANUM. The doses of it, as in other cases of spasms, should be proportioned to the violence of the disease. From a teaspoonful to near a table-spoonful have been given in some instances, before relief has been obtained. Where the powers of life appear to be suddenly suspended, the same remedies should be used, which have been so successfully employed in recovering persons supposed to be dead from drowning.

Care should be taken in every case of disease, or apparent death, from drinking cold water, to prevent the patient's suffering from being surrounded, or even attended, by too many people.

Persons who have been recovered from the immediate danger which attends this disease are sometimes affected, after it, by inflammations and obstructions in the breast or liver. These generally yield to the usual remedies which are administered in those complaints, when they arise from other causes.

If neither the voice of reason, nor the fatal examples of

those who have perished from this cause, are sufficient to produce restraint in drinking a *large* quantity of *cold* liquors, when the body is *preternaturally* heated, then let me advise to—

1. Grasp the vessel out of which you are about to drink for a minute or longer, with both your hands. This will abstract a portion of heat from the body, and impart it at the same time to the cold liquor, provided the vessel be made of metal, glass, or earth; for heat follows the same laws, in many instances, in passing through bodies, with regard to its relative velocity, which we observe to take place in electricity.

2. If you are not furnished with a cup, and are obliged to drink by bringing your mouth in contact with the stream which issues from a pump, or a spring, always wash your hands and face, previously to your drinking, with a little of the cold water. By receiving the shock of the water first upon those parts of the body, a portion of its heat is conveyed away, and the vital parts are thereby defended from the action of the cold.

By the use of these preventives, inculcated by advertisements pasted upon pumps by the Humane Society, death from drinking cold water has become a rare occurrence for many years past in Philadelphia.

AN ACCOUNT
OF THE
CURE OF SEVERAL DISEASES
BY THE
EXTRACTION OF DECAYED TEETH.

AN INQUIRY, &c.

SOME time in the month of October, 1801, I attended Miss A. C. with a rheumatism in her hip joint, which yielded, for awhile, to the several remedies for that disease. In the month of November it returned with great violence, accompanied with a severe tooth-ache. Suspecting the rheumatic affection was excited by the pain in her tooth, which was decayed, I directed it to be extracted. The rheumatism immediately left her hip, and she recovered in a few days. She has continued ever since to be free from it.

Soon after this I was consulted by Mrs. J. R. who had been affected for several weeks with dyspépsia and tooth-ache. Her tooth, though no mark of decay appeared in it, was drawn by my advice. The next day she was relieved from her distressing stomach complaints, and has continued ever since to enjoy good health. From the soundness of the external part of the tooth, and the adjoining gum, there was no reason to suspect a discharge of matter from it had produced the disease in her stomach.

Some time in the year 1801 I was consulted by the father of a young gentleman in Baltimore, who had been affected with epilepsy. I inquired into the state of his teeth, and was informed that several of them in his upper jaw were much decayed. I directed them to be extracted, and advised him afterwards to lose a few ounces of blood, at any time when he felt the premonitory symptoms of a recurrence of his fits. He followed my advice, in consequence of which I had lately the pleasure of hearing from his brother that he was perfectly cured.

I have been made happy by discovering that I have

only added to the observations of other physicians, in pointing out a connection between the extraction of decayed and diseased teeth and the cure of general diseases. Several cases of the efficacy of that remedy in relieving head-ache and vertigo are mentioned by Dr. Darwin. Dr. Gater relates that Mr. Pettit, a celebrated French surgeon, had often cured intermitting fevers, which had resisted the bark for months, and even years, by this prescription; and he quotes from his works two cases, the one of consumption, the other of vertigo, both of long continuance, which were suddenly cured by the extraction of two decayed teeth in the former, and of two supernumerary teeth in the latter case.*

In the second number of a late work, entitled. “Bibliothèque Germanique Medico Chirurgicale,” published in Paris, by Dr. Bluver and Dr. Delaroche, there is an account, by Dr. Siebold, of a young woman who had been affected for several months with great inflammation, pain and ulcers, in her right upper and lower jaws, at the usual time of the appearance of the catamenia, which at that period were always deficient in quantity. Upon inspecting the seats of those morbid affections, the Doctor discovered several of the *molars* in both jaws to be decayed. He directed them to be drawn, in consequence of which the woman was relieved of the monthly disease in her mouth, and afterwards had a regular discharge of her catamenia.

These facts, though but little attended to, should not surprise us, when we recollect how often the most distressing general diseases are brought on by very inconsiderable inlets of morbid excitement into the system. A small tumour, concealed in a fleshy part of the leg, has been known to bring on epilepsy. A trifling wound with a splinter or a nail, even after it has healed, has often induced a fatal tetanus. Worms in the bowels have produced internal dropsy of the brain, and a stone in the kidney has excited the most violent commotions in every part of the system. Many hundred facts of a similar nature are to be met with in the records of medicine.

* Recherches sur differens points de Physiologie de Pathologie et de Therapeutique, p. 353, 354.

When we consider how often the teeth, when decayed, are exposed to irritation from hot and cold drinks and aliments, from pressure by mastication, and from the cold air, and how intimate the connection of the mouth is with the whole system, I am disposed to believe they are often the unsuspected causes of general, and particularly of nervous diseases. When we add to the list of those diseases the morbid effects of the acrid and putrid matters which are sometimes discharged from caries teeth, or from ulcers in the gums created by them, also the influence which both have in preventing perfect mastication, and the connection of that animal function with good health, I cannot help thinking that our success in the treatment of all chronic diseases would be very much promoted, by directing our inquiries into the state of the teeth in sick people, and by advising their extraction in every case in which they are decayed. It is not necessary that they should be attended with pain, in order to produce diseases, for splinters, tumours, and other irritants before mentioned, often bring on disease and death, when they give no pain, and are unsuspected as causes of them. This translation of sensation and motion to parts remote from the place where impressions are made, appears in many instances, and seems to depend upon an original law of the animal economy.

OBSERVATIONS
UPON
WORMS IN THE ALIMENTARY CANAL.
AND UPON
ANTHELMINTIC MEDICINES.

OBSERVATIONS, &c.

WITH great diffidence I venture to lay before the public my opinions upon worms; nor should I have presumed to do it, had I not entertained a hope of thereby exciting further inquiries upon the subject.

When we consider how universally worms are found in all young animals, and how frequently they exist in the human body, without producing disease of any kind, it is natural to conclude, that they serve some useful and necessary purposes in the animal economy. Do they consume the superfluous aliment which all young animals are disposed to take, before they have been taught, by experience or reason, the bad consequences which arise from it? It is no objection to this opinion, that worms are unknown in the human body in some countries. The laws of nature are diversified, and often suspended under peculiar circumstances in many cases, where the departure from uniformity is still more unaccountable than in the present instance. Do worms produce diseases from an *excess* in their *number*, and an *error* in their place, in the same manner that blood, bile, and air produce diseases from an *error* in their place, or from *excess* in their *quantities*? Before these questions are decided I shall mention a few facts which have been the result of my own observations upon this subject.

1. In many instances, I have seen worms discharged in the small-pox and measles, from children who were in perfect health previously to their being attacked by those diseases, and who never before discovered a single symptom of worms. I shall say nothing here of the swarms of worms which are discharged in fevers of all kinds, until I attempt to prove that an idiopathic fever is never produced by worms.

2. Nine out of ten of the cases which I have seen of worms, have been in children of the grossest habits and most vigorous constitutions. This is more especially the case, where the worms are dislodged by the small-pox and measles. Doctor Capelle of Wilmington, in a letter which I received from him, informed me, that in the livers of sixteen out of eighteen rats which he dissected he found a number of the *tænia* worms. The rats were fat, and appeared in other respects to have been in perfect health. The two rats in which he found no worms, he says, "were very lean, and their livers smaller in proportion than the others."

3. In weakly children, I have often known the most powerful anthelmintics given without bringing away a single worm. If these medicines have afforded any relief, it has been by their tonic quality. From this fact, is it not probable—the conjecture, I am afraid, is too bold, but I will risk it :—is it not probable, I say, that children are sometimes disordered from the want of worms? Perhaps the tonic medicines which have been mentioned render the bowels a more quiet and comfortable asylum for them, and thereby provide the system with the means of obviating the effects of crapulas, to which all children are disposed. It is in this way that nature, in many instances, cures evil by evil. I confine the salutary office of worms only to that species of them which is known by the name of the round worm, and which occurs most frequently in children.

Is there any such disease as an idiopathic WORM-FEVER? The Indians in this country say there is not, and ascribe the discharge of worms to a fever and not a fever to the worms.*

By adopting this opinion, I am aware that I contradict the observations of many eminent and respectable physicians.

Dr. Huxham describes an epidemic pleurisy, in the month of March, in the year 1740, which he supposes was produced by his patients feeding upon some corn that had been injured by the rain the August before.† He

* See the Inquiry into the Diseases of the Indians.

† Vol. ii. of his Epidemics, p. 56.

likewise mentions that a number of people, and those too of the elderly sort,* were afflicted at one time with worms, in the month of April, in the year 1743.

Lieuteaud gives an account of an epidemic worm fever from Velchius, an Italian physician;† and Sauvages describes, from Vandermonde, an epidemic dysentery from worms, which yielded finally only to worm medicines.‡ Sir John Pringle, and Doctor Monro, likewise, frequently mention worms as accompanying the dysentery and remitting fever, and recommend the use of calomel as an antidote to them.

I grant that worms appear more frequently in some epidemic diseases than in others, and oftener in some years than in others. But may not the same heat, moisture, and diet, which produced the diseases, have produced the worms? And may not their discharge from the bowels have been occasioned in those epidemics, as in the small-pox and measles, by the increased heat of the body, by the want of nourishment, or by an anthelmintic quality being accidentally combined with some of the medicines that are usually given in fevers?

In answer to this, we are told that we often see the crisis of a fever brought on by the discharge of worms from the bowels by means of a purge, or by anthelmintic medicine. Whenever this is the case, I believe it is occasioned by offending bile being dislodged by means of the purge, at the same time with the worms, or by the anthelmintic medicine (if not a purge) having been given on, or near, one of the usual critical days of the fever. What makes the latter supposition probable is, that worms are seldom suspected in the beginning of fevers, and anthelmintic medicines seldom given, till every other remedy has failed of success; and this generally happens about the usual time in which fevers terminate in life or death.

It is very remarkable, that since the discovery and description of the hydrocephalus internus we hear and read much less than formerly of worm fevers. I suspect that disease of the brain has laid the foundation for the principal part of the cases of worm-fevers, which are upon

* P. 136.

† Vol, p. 76.

‡ Vol. ii. p. 329.

record in books of medicine. I grant that worms sometimes increase the danger from fevers, and often confound the diagnosis and prognosis of them, by a number of new and anomalous symptoms. But here we see nothing more than that complication of symptoms, which often occurs in diseases of a very different and opposite nature.

Having rejected worms as the cause of fevers, I proceed to remark, that the diseases most commonly produced by them belong to Dr. Cullen's class of *NEUROSES*. And here I might add, that there is scarcely a disease, or symptom of a disease, belonging to this class, which is not produced by worms.

It would be only publishing extracts from books, to describe them.

The *chronic* and *nervous* diseases of children, which are so numerous, and frequently fatal, are, I believe, frequently occasioned by worms. There is no great danger, therefore, of doing mischief, by prescribing anthelmintic medicines in all our first attempts to cure their chronic and nervous diseases.

I have been much gratified by finding myself supported in the above theory of worm-fevers, by the late Dr. William Hunter, and by Dr. Butter, in his excellent treatise upon the infantile remitting fever.

I have taken great pains to find out, whether the presence of the different species of worms might not be discovered by certain peculiar symptoms: but all to no purpose. I once attended a girl of twelve years of age in a fever, who discharged four yards of a *tænia*, and who was so far from having discovered any peculiar symptom of this species of worms, that she had never complained of any other indisposition, than now and then a slight pain in the stomach, which often occurs in young girls from a sedentary life, or from errors in their diet. I beg leave to add further, that there is not a symptom which has been said to indicate the presence of worms of any kind, as the cause of a disease, that has not deceived me; and none oftener than the one that has been so much depended upon, viz. the picking of the nose. A discharge of worms from the bowels is, perhaps, the only symptom that is pathognomonic of their presence in the intestines.

I shall now make a few remarks upon anthelmintic remedies.

But I shall first give an account of some experiments which I made in the year 1771, upon the common earth-worm, in order to ascertain the anthelmintic virtues of a variety of substances. I made choice of the earth-worm for this purpose, as it is, according to naturalists, nearly the same in its structure, manner of subsistence, and mode of propagating its species, with the round worm of the human body.

In the first column I shall set down, under distinct heads, the substances in which worms were placed; and in the second and third columns the *time* of their death, from the action of these substances upon them.

I. BITTER AND ASTRINGENT SUB- STANCES.	Hours.	Minutes.
Watery infusion of aloes	2	48
— of rhubarb	1	30
— of Peruvian bark	1	30
II. PURGES.		
Watery infusion of Jalap	1	—
— bear's foot	1	17
— gamboge	1	—
III. SALTS.		
1. <i>Acids.</i>		
Vinegar	—	1½ convulsed.
Lime juice	—	1
Diluted nitrous acid	—	1½
2. <i>Alkali.</i>		
A watery solution of salt of tartar	—	2 convulsed, throwing up a mucous on the surface of the water.
3. <i>Neutral Salts.</i>		
In a watery solution of common salt	—	1 convulsed.
— of nitre	—	ditto.
— of sal diuretic	—	ditto.
— of sal ammoniac	—	1½
— of common salt and sugar	—	4½
4. <i>Earthy and metallic salts.</i>		
In a watery solution of Epsom salt	—	15½
— of rock alum	—	10
— of corrosive sublimate	—	1½ convulsed.
— of calomel	—	49
— of tirpeth mineral	—	1 convulsed
— of sugar of lead	—	3
— of green vitriol	—	1
— of blue vitriol	—	10
— of white vitriol	—	30

		Hours.	Minutes.
IV. METALS.			
Filings of steel			25 $\frac{1}{2}$
Filings of tin		1	—
V. CALCAREOUS EARTH.			
Chalk		2	—
VI. NARCOTIC SUBSTANCES.			
Watery infusion of opium		—	11 $\frac{1}{2}$ convulsed.
— of Carolina pink-root		—	33
— of tobacco		—	14
VII. ESSENTIAL OILS.			
Oil of Wormwood		—	3 convulsed.
— of mint.		—	3
— of carraway seed		—	3
— of amber		—	1 $\frac{1}{2}$
— of anniseed		—	4 $\frac{1}{2}$
— of turpentine		—	6
VIII. ARSENIC.			
A watery solution of white arsenic		near 2	—
IX. FERMENTED LIQUORS.			
In Madeira wine		—	3 convulsed.
Claret		—	10
X. DISTILLED SPIRITS.			
Common rum		—	1 convulsed.
XI. THE FRESH JUICES OF RIPE FRUITS.			
The juice of red cherries		—	5 $\frac{1}{2}$
— of black do.		—	5
— of red currants		—	2 $\frac{1}{2}$
— of gooseberries.		—	3 $\frac{1}{2}$
— of wortleberries		—	12
— of black berries		—	7
— of raspberries		—	5 $\frac{1}{2}$
— of plums		—	13
— of peaches		—	25
The juice of water melons, no effect		—	—
XII. SACCHARINE SUBSTANCES.			
Honey		—	7
Molasses		—	7
Brown sugar		—	30
Manna		—	21 $\frac{1}{2}$
XIII. IN AROMATIC SUBSTANCES.			
Camphor		—	5
Pimento		—	31
Black pepper		—	45
XIV. FOETID SUBSTANCES.			
Juice of onions		—	31
Watery infusion of assafœtida		—	27 $\frac{1}{2}$
— Santinicum, or worm seed		1	—

XV. MISCELLANEOUS SUBSTANCES	Hours.	Minutes.
Sulphur mixed with oil	2	—
Æthiops mineral	2	—
Sulphur	2	—
Solution of gunpowder	—	11 $\frac{1}{2}$
— of soap	—	19 $\frac{1}{2}$
Oxymel of squills	—	31 $\frac{1}{2}$
Sweet oil	2	30

In the application of these experiments to the human body, an allowance must always be made for the alteration which the several anthelmintic substances that have been mentioned may undergo, from mixture and diffusion in the stomach and bowels.

In order to derive any benefit from these experiments, as well as from the observations that have been made upon anthelmintic medicines, it will be necessary to divide them into such as act,—

1. Mechanically,
2. Chemically upon worms; and,—

3. Into those which possess a power composed of chemical and mechanical qualities.

1. The mechanical medicines act indirectly and directly upon the worms.

Those which act *indirectly* are, vomits, purges, bitter and astringent substances, particularly aloes, rhubarb, bark, bear's-foot, and worm seed. Sweet oil acts indirectly and very feebly upon worms. It was introduced into medicine from its efficacy in destroying the botts in horses; but the worms which infest the human bowels are of a different nature, and possess very different organs of life from those which are found in the stomach of a horse.

Those mechanical medicines which act *directly* upon the worms, are cowage* and powder of tin. The last of these medicines has been supposed to act chemically upon the worms, from the arsenic which adheres to it; but from the length of time a worm lived in a solution of white arsenic, it is probable the tin acts altogether mechanically upon them.

2. The medicines which act chemically upon worms appear, from our experiments, to be very numerous.

Nature has wisely guarded children against the morbid

* Dolichos Prurians, of Linnæus.

effects of worms, by implanting in them an early appetite for common salt, ripe fruits, and saccharine substances ; all of which appear to be among the most speedy and effectual poisons for worms.

Let it not be said, that nature here counteracts her own purposes. Her conduct in this business is conformable to many of her operations in the human body, as well as throughout all her works. The bile is a necessary part of the animal fluids, and yet an appetite for ripe fruits seems to be implanted, chiefly to obviate the consequences of its excess, or acrimony, in the summer and autumnal months.

The use of common salt as an anthelmintic medicine is both ancient and universal. Celsus recommends it. In Ireland it is a common practice to feed children, who are afflicted by worms, for a week or two upon a salt sea-weed, and when the bowels are well charged with it, to give a purge of wort in order to carry off the worms, after they are debilitated by the salt diet.

I have administered many pounds of common salt coloured with cochineal, in doses of half a drachm, upon an empty stomach in the morning, with great success in destroying worms.

Ever since I observed the effects of sugar and other sweet substances upon worms, I have recommended the liberal use of all of them in the diet of children, with the happiest effects. The sweet substances probably act in preventing the diseases from worms in the stomach only, into which they often insinuate themselves, especially in the morning. When we wish to dislodge worms from the bowels by sugar or molasses, we must give these substances in larger quantities, so that they may escape in part the action of the stomach upon them.

I can say nothing from my own experience of the efficacy of the mineral salts, composed of copper, iron, and zinc, combined with vitriolic acid, in destroying worms in the bowels. Nor have I ever used the corrosive sublimate in small doses as an anthelmintic.

I have heard of well-attested cases of the efficacy of the oil of turpentine in destroying worms.

The expressed juice of onions and of garlic are very common remedies for worms. From one of the experi-

ments, it appears that the onion juice possesses strong anthelmintic virtues.

I have often prescribed a tea-spoonful of gun-powder in the morning, upon an empty stomach, with obvious advantage. The active medicine here is probably the nitre.

I have found a syrup made of the bark of the Jamaica cabbage-tree* to be a powerful, as well as a most agreeable anthelmintic medicine. It sometimes purges and vomits, but its good effects may be obtained, without giving it in such doses as to produce these evacuations.

There is not a more *certain* anthelmintic than Carolina pink-root.† But as there have been instances of death having followed excessive doses of it, imprudently administered, and as children are often affected by giddiness, stupor, and a redness and pain in the eyes, after taking it, I acknowledge that I have generally preferred to it less certain, but more safe, medicines for destroying worms.

3. Of the medicines whose action is compounded of mechanical and chemical qualities, calomel, jalap, and the powder of steel, are the principal.

Calomel, in order to be effectual, must be given in large doses. It is a safe and powerful anthelmintic. Combined with jalap, it often brings away worms when given for other purposes.

Of all the medicines that I have administered, I know of none more safe and certain than the simple preparations of iron, whether they be given in the form of steel-filings, or of the rust of iron. If ever they fail of success, it is because they are given in too small doses. I generally prescribe from five to thirty grains, every morning, to children between one year and ten years old; and I have been taught by an old sea-captain, who was cured of a *tænia* by this medicine, to give from two drachms to half an ounce of it, every morning, for three or four days, not only with safety, but with success.

I shall conclude this essay with the following remarks:

1. Where the action of medicines upon worms in the bowels does not agree exactly with their action upon the earth-worms, in the experiments that have been related

* *Geoffrea*, of Linnæus.

† *Spigelia Marylandica*, of Linnæus.

it must be ascribed to the medicines being more or less altered by the action of the stomach upon them. I conceive that the superior anthelmintic qualities of pink-root, steel-filings, and calomel (all of which acted but slowly upon the earth-worms compared with many other substances) are in a great degree occasioned by their escaping the digestive powers unchanged, and acting in a concentrated state upon the worms.

2. In fevers attended with anomalous symptoms, which are supposed to arise from worms, I have constantly refused to yield to the solicitations of my patients, to abandon the indications of cure in the fever, and to pursue worms as the *principal* cause of the disease. While I have adhered steadily to the usual remedies for the different states of fever, in all their stages, I have at the same time blended those remedies occasionally with anthelmintic medicines. In this I have imitated the practice of physicians in many other diseases, in which troublesome and dangerous symptoms are pursued, without seducing the attention from the original disease. The anthelmintic medicines prescribed in these cases should not be the rust of iron, and common salt, which are so very useful in chronic diseases from worms, but calomel and jalap, and such other medicines as aid in the cure of fevers.

AN ACCOUNT
OF THE
EXTERNAL USE OF ARSENIC,
IN
THE CURE OF CANCERS.

AN ACCOUNT, &c.

A FEW years ago, a certain Doctor Hugh Martin, a surgeon of one of the Pennsylvania regiments stationed at Pittsburg, during the latter part of the late war, came to this city, and advertised to cure cancers with a medicine which he said he had discovered in the woods, in the neighbourhood of the garrison. As Dr. Martin had once been my pupil, I took the liberty of waiting upon him, and asked him some questions respecting his discovery. His answers were calculated to make me believe, that his medicine was of a vegetable nature, and that it was originally an Indian remedy. He showed me some of the medicine, which appeared to be the powder of a well-dried root of some kind. Anxious to see the success of this medicine in cancerous sores, I prevailed upon the Doctor to admit me to see him apply it in two or three cases. I observed, in some instances, he applied a powder to the parts affected, and in others only touched them with a feather dipped in a liquid which had a white sediment, and which he made me believe was the vegetable root diffused in water. It gave me great pleasure to witness the efficacy of the Doctor's applications. In several cancerous ulcers, the cures he performed were complete. Where the cancers were much connected with the lymphatic system, or accompanied with a scrophulous habit of body, his medicine always failed, and, in some instances, did evident mischief.

Anxious to discover a medicine that promised relief in even a few cases of cancers, and supposing that all the caustic vegetables were nearly alike, I applied the *phytolacca* or poke-root, the *stramonium*, the *arum*, and one or two others, to foul ulcers, in hopes of seeing the same effects from them which I had seen from Doctor Martin's powder; but in these I was disappointed. They gave some pain, but performed no cures. At length I was furnished by a gentleman from Pittsburg with a powder which I had no doubt, from a variety of circumstances, was of the same kind as that used by Dr. Martin. I applied it to a fungous ulcer, but without producing the degrees of pain, inflammation, or discharge, which I had been accustomed to see from the application of Dr. Martin's powder. After this, I should have suspected that the powder was not a *simple* root, had not the Doctor continued upon all occasions to assure me, that it was wholly a vegetable preparation.

In the beginning of the year 1784, the Doctor died, and it was generally believed that his medicine had died with him. A few weeks after his death I procured, from one of his administrators, a few ounces of the Doctor's powder, partly with a view of applying it to a cancerous sore which then offered, and partly with a view of examining it more minutely than I had been able to do during the Doctor's life. Upon throwing the powder, which was of a brown colour, upon a piece of white paper, I perceived distinctly a number of white particles scattered through it. I suspected at first that they were corrosive sublimate, but the usual tests of that metallic salt soon convinced me that I was mistaken. Recollecting that arsenic was the basis of most of the celebrated cancer powders that have been used in the world, I had recourse to the tests for detecting it. Upon sprinkling a small quantity of the powder upon some coals of fire, it emitted the garlick smell so perceptibly as to be known by several persons whom I called into the room where I made the experiment, and who knew nothing of the object of my inquiries. After this, with some difficulty, I picked out about three or four grains of the white powder, and bound them between two pieces of copper, which I threw into the fire. After the copper pieces became red hot, I took them out of the fire, and

when they had cooled, discovered an evident whiteness imparted to both of them. One of the pieces afterwards looked like dull silver. These two tests have generally been thought sufficient to distinguish the presence of arsenic in any bodies; but I made use of a third, which has lately been communicated to the world by Mr. Bergman, and which is supposed to be in all cases infallible.

I infused a small quantity of the powder in a solution of a vegetable alkali in water for a few hours, and then poured it upon a solution of blue vitriol in water. The colour of the vitriol was immediately changed to a beautiful green, and afterwards precipitated.

I shall close this paper with a few remarks upon this powder, and upon the cure of cancers and foul ulcers of all kinds.

1. The use of caustics in cancers and foul ulcers is very ancient and universal. But I believe *arsenic* to be the most efficacious of any that has ever been used. It is the basis of Plunket's and probably of Guy's well-known cancer powders. The great art of applying it successfully, is to dilute and mix it in such a manner as to mitigate the violence of its action. Doctor Martin's composition was happily calculated for this purpose. It gave less pain than the common or lunar caustic. It excited a moderate inflammation, which separate the morbid from the sound parts, and promoted a plentiful afflux of humours to the sore during its application. It seldom produced an eschar; hence it insinuated itself into the deepest recesses of the cancers, and frequently separated those fibres in an unbroken state, which are generally called the roots of the cancer. Upon this account, I think, in some ulcerated cancers it is to be preferred to the knife. It has no action upon the sound skin. This Doctor Hall proved, by confining a small quantity of it upon his arm for many hours. In those cases where Doctor Martin used it to extract cancerous or schirrous tumours, that were not ulcerated, I have reason to believe that he always broke the skin with Spanish flies.

2. The arsenic used by the Doctor was the pure white arsenic. I should suppose from the examination I made of the powder with the eye, that the proportion of arsenic to the vegetable powder, could not be more than one-for-

tieth part of the whole compound. I have reason to think that the Doctor employed different vegetable substances at different times. The vegetable matter with which the arsenic was combined in the powder which I used in my experiments, was probably nothing more than the powder of the root and berries of the solanum lethale, or deadly nightshade. As the principal, and perhaps the only design of the vegetable addition was to blunt the activity of the arsenic, I should suppose that the same proportion of common wheat flour as the Doctor used of his caustic vegetables, would answer nearly the same purpose. In those cases where the Doctor applied a feather dipped in a liquid to the sore of his patient, I have no doubt but his phial contained nothing but a weak solution of arsenic in water. This is no new method of applying arsenic to foul ulcers. Doctor Way, of Wilmington, has spoken in the highest terms to me of a wash for foulness on the skin, as well as old ulcers, prepared by boiling an ounce of white arsenic in two quarts of water to three pints, and applying it once or twice a day.

3. I mentioned, formerly, that Doctor Martin was often unsuccessful in the application of his powder. This was occasioned by his using it indiscriminately in *all* cases. In schirrous and cancerous tumours the knife should always be preferred to the caustic. In cancerous ulcers attended with a scrophulous or a bad habit of body, such particularly as have their seat in the neck, in the breasts of females, and in the axiliary glands, it can only protract the patient's misery. Most of the cancerous sores cured by Doctor Martin were seated on the nose, or cheeks, or upon the surface or extremities of the body. It remains yet to discover a cure for cancers that taint the fluids, or infect the whole lymphatic system. This cure I apprehend must be sought for in diet, or in the long use of some internal medicine.

To pronounce a disease incurable, is often to render it so. The intermitting fever if left to itself, would probably prove frequently and perhaps more speedily fatal than cancers. And as cancerous tumours and sores are often neglected, or treated improperly by injudicious people, from an apprehension that they are incurable (to which the frequent ad-

vice of physicians "to let them alone," has no doubt contributed) perhaps the introduction of arsenic into regular practice as a remedy for cancers, may invite to a more early application to physicians, and thereby prevent the deplorable cases that have been mentioned, which are often rendered so by delay or unskilful management.

4. It is not in cancerous sores only that Doctor Martin's powder has been found to do service. In sores of all kinds, and from a variety of causes, where they have been attended with fungous flesh, or callous edges, I have used the Doctor's powder with advantage.

I flatter myself that I shall be excused in giving this detail of a *quack* medicine, when we reflect that it was from the inventions and temerity of quacks, that physicians have derived some of their most active and useful medicines.

AN INQUIRY

INTO THE

CAUSE AND CURE OF SORE LEGS.

AN INQUIRY, &c.

HOWEVER trifling these complaints may appear, they compose a large class of the diseases of a numerous body of people. Hitherto, the persons afflicted by them have been too generally abandoned to the care of empirics either because the disease was considered as beneath the notice of physicians, or because they were unable to cure it. I would rather ascribe it to the latter, than to the former cause, for pride has no natural fellowship with the profession of medicine.

The difficulty of curing sore legs has been confessed, by physicians in every country. As far as my observations have extended, I am disposed to ascribe this difficulty to the uniform and indiscriminate mode of treating them, occasioned by the want of a theory which shall explain their proximate cause. I shall attempt in a few pages to deliver one, which however imperfect, will, I hope, lay a foundation for more successful inquiries upon this subject hereafter.

I shall begin my observations upon this disease, by delivering and supporting the following propositions.

I. SORE LEGS are induced by general debility. This I infer from the occupations and habits of the persons who are most subject to them. They are day-labourers, and sailors, who are in the habit of lifting great weights; also washer-women, and all other persons, who pass the greatest part of their time upon their feet. The blood, vessels and muscular fibres of the legs are thus overstretch-ed, by which means either a rupture, or such a languid action in the vessels, is induced, as that an accidental wound from any cause, even from the scratch of a pin, or the bite of a mosquito, will not easily heal. But labourers,

sailors and washer-woman, are not the only persons who are afflicted with sore legs. Hard drinkers of every rank and description are likewise subject to them. Where strong drink, labour, and standing long on the feet are united, they more certainly dispose to sore legs, than when they act separately. In China, where the labour which is performed by brutes in other countries is performed by men, varices on the legs are very common among the labouring people. Perhaps, the reason why the debility induced in the legs produces varices instead of ulcers in these people, may be owing to their not adding the debilitating stimulus of strong drink to that of excessive labour.

It is not extraordinary that the debility produced by intemperance in drinking ardent spirits should appear first in the lower extremities. The debility produced by intemperance in the use of wine makes its first appearance in the form of gout, in the same part of the body. The gout, it is true, discovers itself most frequently in pain only, but there are cases in which it has been terminated in ulcers, and even mortifications on the legs.

II. Sore legs are connected with a morbid state of the whole system. This I infer,—

1. From the causes which induce them, all of which act more or less upon every part of the body.

2. From their following or preceding diseases, which obviously belong to the whole system. Fevers and dysenteries often terminate critically in this disease; and the pulmonary consumption and apoplexy have often been preceded by the suppression of a habitual discharge from a sore leg. The two latter diseases have been ascribed to the translation of a morbid matter to the lungs or brain: but it is more rational to ascribe them to a previous debility in those organs by which means their vessels were more easily excited into action and effusion by the stimulus of the plethora, induced upon the system in consequence of the confinement of the fluids formerly discharged from the leg, in the form of a pus. This plethora can do harm only where there is previous debility, for I maintain that the system (when the solids are exactly toned) will always relieve itself of a sudden preternatural accumulation of fluids by means of some natural emunc-

tory. This has been often observed in the menorrhagia, which accompanies plentiful living in women, and in the copious discharges from the bowels and kidneys, which follow a suppression of the perspiration.

3. I infer it, from their appearing almost universally in one disease, which is evidently a disease of the whole system, viz. the scurvy.

4. From their becoming in some cases the outlets of menstrual blood, which is discharged in consequence of a plethora, which affects more or less every part of the female system.

5. I infer it from the *symptoms* of sore legs, which are in some cases febrile, and affect the pulse in every part of the body with preternatural frequency or force. These symptoms were witnessed, in an eminent degree, in two of the patients who furnished subjects for clinical remarks in the Pennsylvania hospital some years ago.

6. I infer that sore legs are a disease of the whole system, from the manner in which they are sometimes cured by nature and art. They often prove the outlets of many general diseases, and all the remedies which cure them act more or less upon the whole system.

In all cases of sore legs there is a tonic and atonic state of the whole system. The same state of excessive or weak morbid action takes place in the parts which are affected by the sores. The remedies to cure them, therefore, should be *general* and *local*.

In cases where the arterial system is affected by too much tone, the general remedies should be,—

I. BLOOD-LETTING. Of the efficacy of this remedy in disposing ulcers suddenly to heal, the two clinical patients before-mentioned exhibited remarkable proofs, in the presence of all the students of medicine in the university. The blood drawn was sizy in both cases. I have not the merit of having introduced this remedy into practice in the cure of ulcers. I learned it from Sir John Pringle. I have known it to be used with equal success in a sore breast, attended by pain and inflammation, after all the usual remedies in that disease had been used to no purpose.

II. GENTLE PURGES.

III. NITRE. From fifteen to twenty grains of this medicine should be given three times a-day.

IV. A TEMPERATE DIET, and a total abstinence from fermented and distilled liquors.

V. COOL and PURE AIR.

VI. REST, in a recumbent posture of the body.

The *local* remedies in this state of the system should be,

I. Cold water. Dr. Rigby has written largely in favour of this remedy, when applied to local inflammations. From its good effect in allaying the inflammation which sometimes follows the puncture which is made in the arm in communicating the small-pox, and from the sudden relief it affords in the inflammatory state of the ophthalmia and in the piles, no one can doubt of its efficacy in sore legs, accompanied by inflammation in those vessels which are the immediate seat of the disease.

II Soft poultices of bread and milk, or of bread moistened with lead water. Dr. Underwood's method of making a poultice of bread and milk should be preferred in this case. He directs us first to boil the milk, then to powder the bread, and throw it into the milk, and after they have been intimately mixed, by being well stirred and boiled together, they should be poured out and spread upon a rag, and a knife dipped in sweet oil or lard should be run over them. The solidity and consistence of the poultice is hereby better preserved, than when the oil or lard is mixed with the bread and milk over the fire.

III. When the inflammation subsides, adhesive plasters so applied as to draw the sound edges of the sores together. This remedy has been used with great success by Dr. Physick, in the Pennsylvania hospital, and in his private practice.

IV. Above all, rest, and a horizontal posture of the leg. Too much cannot be said in favour of this remedy in this species of sore legs. Nannoni, the famous Italian surgeon, sums up the cure of sore legs in three words, viz. "Tempo, riposo, e pazienza;" that is, in time, rest, and patience. A friend of mine, who was cured by this surgeon of a sore leg, many years ago, informed me, that he confined him to his bed during the greatest part of the time that he was under his care.

In sore legs, attended by too little general and local action, the following remedies are proper

I. **BARK.** It should be used plentifully, but with a constant reference to the state of the system; for the changes in the weather, and other accidental circumstances, often produce such changes in the system, as to render its disuse for a short time frequently necessary.

II. **MERCURY.** This remedy has been supposed to act by altering the fluids, or by discharging a morbid matter from them, in curing sore legs. But this is by no means the case. It appears to act as a universal stimulant; and if it prove most useful when it excites a salivation, it is only because in this way it excites the most general action in the system.

III. **MINERAL TONICS,** such as the different preparations of iron, copper and zinc.

IV. **GENTLE EXERCISE.** Rest, and a recumbent posture of the body, so proper in the tonic, are both hurtful in this species of sore legs. The efficacy of exercise, even of the active kind, in the cure of sore legs, accompanied by deficient action in the vessels, may easily be conceived from its good effects after gun-shot wounds, which are mentioned by Dr. Jackson *. He tells us, that those British soldiers who had been wounded at the battle of Guilford, in North Carolina who were turned out of the military hospitals and followed the army, soonest recovered of their wounds. It was remarkable that if they delayed only a few days on the road, their wounds grew worse, or ceased to heal.

In the use of the different species of exercise, the same regard should be had to the state of the system, which has been recommended in other diseases.

V. **A nutritious and moderately stimulating diet,** consisting of milk, saccharine vegetables, animal food, malt liquors and wine.

Wort has done great service in sore legs. The manner in which I have directed it to be prepared and taken is as follows: To three or four heaped table-spoonful of the malt, finely powdered and sifted, add two table spoonful of brown sugar, and three or four of Madira, sherry, or Lisbon wine, and a quart of boiling water. After they

* Medical Journal, 1790.

have stood a few hours, it may be drunken liberally by the patient, stirring it each time before he takes it, so that the whole substance of the malt may be conveyed into the stomach. A little lime-juice may be added if the patient requires it, to make it more pleasant. The above quantity may be taken once, twice, or three times a-day, at the pleasure of the patient, or according to the indication of his disease.

VI. OPIUM. This remedy is not only useful in easing the pain of a sore leg, but co-operates with other cordial medicines in invigorating the whole system.

VII. Baglivi says that in Rome, and Dr. Cleghorn tells us that in Minorca, ulcers of the legs are "almost incurable." It is probable there are many parts of the world in which the air has the same unfriendly influence upon this disease. In such cases it will be proper to advise a change of climate.

The *local* applications should consist of such substances as are gently escarotic, and which excite an action in the torpid vessels of the affected part. Arsenic, precipitate, and blue vitriol, have all been employed with success for this purpose. Dr. Griffiths informed me, that he has frequently accomplished the same thing in the dispensary by applications of tarter emetic. They should all be used, if necessary, in succession to each other; for there is often the same idiosyncrasy in a sore leg to certain topical applications, that there is in the stomach to certain aliments. After the use of these remedies, astringents and tonics should be applied, such as an infusion of Peruvian, or white-oak bark, the water in which the smiths extinguish their irons, lime-water, bread dipped in a weak solution of green vitriol (so much commended by Dr. Underwood) compresses wetted with brandy, or ardent spirits of any kind, and, above all, the adhesive plasters formerly mentioned.

Tight bandages are likewise highly proper here. The laced stocking has been much used. It is made of strong coarse linen. Dr. Underwood gives several good reasons for preferring a flannel roller to the linen stocking. It sets easier on the leg, and yields to the swelling of the muscles in walking.

In scorbutic sores on the legs, navy surgeons have spoken in high terms of an application of a mixture of lime-juice and molasses. Mr. Gillespie commends the use of lime or lemon juice alone, and ascribes many cures to it in the British navy during the late war, after every common application had been used to no purpose.*

It is of the utmost consequence, in the treatment of sore legs, to keep them clean by frequent dressings and washings. The success of old women is oftener derived from their great attention to cleanliness, in the management of sore legs, than to any specifics they possess which are unknown to physicians.

When sore legs are kept from healing by affections of the bone, the treatment should be such as is recommended by practical writers on surgery.

I shall conclude this inquiry by four observations, which are naturally suggested by what has been delivered upon this disease.

1. If it has been proved that sore legs are connected with a morbid state of the whole system, is it not proper to inquire, whether many other diseases, supposed to be local, are not in like manner connected with the whole system; and if sore legs have been cured by general remedies, is it not proper to use them more frequently in local diseases?

2. If there be two states of action in the arteries in sore legs, it becomes us to inquire, whether the same opposite states of action do not take place in many diseases, in which they are not suspected. It would be easy to prove, that they exist in several other local diseases.

3. If the efficacy of the remedies for sore legs, which have been mentioned, depend upon their being accommodated exactly to the state of the arterial system, and if this system be liable to frequent changes, does it not become us to be more attentive to the state of the pulse in this disease, than is commonly supposed to be necessary by physicians?

4. It has been a misfortune in medicine, as well as in other sciences, for men to ascribe effects to one cause, which should be ascribed to many. Hence diseases have

* Medical Journal, vol. vi.

been attributed exclusively to morbid affections of the fluids by some, and of the muscles and nerves by others. Unfortunately, the morbid states of the arterial system, and the influence of those states upon the brain, the nerves, the muscles, the lymphatics, the glands, the viscera, the alimentary canal, and the skin, as well as the reciprocal influence of the morbid states of each of those parts of the body upon the arteries, and upon each other, have been too much neglected in most of our systems of physic. I consider the pathology of the arterial system as a mine. It was first discovered by Dr Cullen. The man who attempts to explore it will probably impoverish himself by his researches; but the men who come after him will certainly obtain from it a treasure, which cannot fail of adding greatly to the riches of medicine.

AN ACCOUNT
OF THE
STATE OF THE BODY AND MIND
IN OLD AGE;
WITH
OBSERVATIONS ON ITS DISEASES,
AND THEIR REMEDIES.

AN ACCOUNT, &c.

MOST of the facts which I shall deliver upon this subject are the result of observations, made during the term of five years, upon persons of both sexes, who had passed the 80th year of their lives. I intended to have given a detail of the names, manner of life, occupations, and other circumstances of each of them; but, upon a review of my notes, I found so great a sameness in the history of most of them, that I despaired, by detailing them, of answering the intention which I have purposed in the following essay. I shall, therefore, only deliver the facts and principles, which are the result of the inquiries and observations I have made upon this subject.

I. I shall mention the circumstances which favour the attainment of longevity.

II. I shall mention the phenomena of body and mind which attend it; and,

III. I shall enumerate its peculiar diseases, and the remedies which are most proper to remove, or moderate them.

I. The circumstances which favour longevity are—

1. *Descent from long-lived ancestors.* I have not found a single instance of a person who has lived to be 80 years old, in whom this was not the case. In some instances I found the descent was only from one, but, in general, it was from both parents. The knowledge of this fact may serve, not only to assist in calculating what are called the chances of lives, but it may be made useful to a physician. He may learn from it to cherish hopes of his patients in chronic, and in some acute diseases, in proportion to the capacity of life they have derived from their ancestors.*

* Dr. Franklin, who died in his 84th year was descended from long-lived parents. His father died at 89, and his mother at 87. His father had 17 children by two wives. The doctor informed me, that he once sat down as one of 11 adult sons and daughters at his father's table. In an excursion he once made to that part of England from whence his family migrated to America, he discovered in a grave-yard, the tomb-stones of several persons of his name, who had lived to be very old. These persons he supposed to have been his ancestors.

2. *Temperance in eating and drinking.* To this remark I found several exceptions. I met with one man of 84 years of age, who had been intemperate in eating; and four or five persons, who had been intemperate in drinking ardent spirits. They had all been day-labourers, or had deferred drinking until they began to feel the languor of old age. I did not meet with a single person, who had not, for the last forty or fifty years of their lives, used tea, coffee, and bread and butter, twice a day as part of their diet. I am disposed to believe that those articles of diet do not materially affect the duration of human life, although they evidently impair the strength of the system. The duration of life does not appear to depend so much upon the strength of the body, or upon the quantity of its excitability, as upon an exact accommodation of stimuli to each of them. A watch spring will last as long as an anchor, provided the forces which are capable of destroying both are always in an exact ratio to their strength. The use of tea and coffee in diet seems to be happily suited to the change which has taken place in the human body by sedentary occupations, by which means less nourishment and stimulus are required than formerly, to support animal life.

3. *The moderate exercise of the understanding.* It has long been an established truth, that literary men (other circumstances being equal) are longer lived than other people. But it is not necessary that the understanding should be employed upon philosophical subjects, to produce this influence upon human life. Business, politics, and religion, which are the objects of attention of men of all classes, impart a vigour to the understanding, which by being conveyed to every part of the body, tends to produce health and long life.

4. *Equanimity of temper.* The violent and irregular actions of the passions tend to wear away the springs of life.

Persons who live upon annuities in Europe have been observed to be longer lived, in equal circumstances, than other people. This is probably occasioned by their being exempted, by the certainty of their subsistence, from those fears of want, which so frequently distract the minds, and

thereby weaken the bodies, of old people. Life-rents have been supposed to have the same influence in prolonging life. Perhaps the *desire of life*, in order to enjoy for as long a time as possible that property, which cannot be enjoyed a second time by a child or relation, may be another cause of the longevity of persons who live upon certain incomes. It is a fact, that the desire of life is a very powerful stimulus in prolonging it, especially when that desire is supported by hope. This is obvious to physicians every day. Despair of recovery is the beginning of death in all diseases.

But obvious and reasonable as the effects of equanimity of temper are upon human life, there are some exceptions in favour of passionate men and women having attained to a great age. The morbid stimulus of anger, in these cases, was probably obviated by less degrees, or less active exercises, of the understanding, or by the defect or weakness of some of the other stimuli which keep up the motions of life.

5. *Matrimony*. In the course of my inquiries, I met with only one person beyond eighty years of age who had never been married. I met with several women who had borne from ten to twenty children, and suckled them all. I met with one woman, a native of Herefordshire, in England, who was in the 100th year of her age, who had borne a child at 60, menstruated till 80, and frequently suckled two of her children (though born in succession to each other) at the same time. She had passed the greatest part of her life over a washing-tub. Of forty persons who died in different parts of the world, above 80 years of age, in the year 1806, there was but one of them that had not been married. A majority of them were women.

6. *Emigration*. I have observed many instances of Europeans who have arrived in America in the decline of life, who have acquired fresh vigour from the impression of our climate, and of new objects, upon their bodies and minds; and whose lives, in consequence thereof, appeared to have been prolonged for many years. This influence of climate upon longevity is not confined to the United States. Of 100 European Spaniards, who emigrate to South-America in early life, 18 live to be above 50, where-

as but 8 or 9 native Spaniards, and but 7 Indians, of the same number, exceed the 50th year of human life.

7. I have not found *sedentary employments* to prevent long life, where they are not accompanied by intemperance in eating or drinking. This observation is not confined to literary men, nor to women only, in whom longevity, without much exercise of body, has been frequently observed. I met with one instance of a weaver; a second of a silver smith; and a third of a shoemaker; among the number of old people, whose histories have suggested these observations.

8. I have not found that *acute*, nor that all *chronic* diseases shorten human life. Dr. Franklin had two successive vomicas in his lungs before he was 40 years old. I met with one man beyond 80, who had survived a most violent attack of the yellow fever; a second who had had several of his bones fractured by falls, and in frays: and many, who had been frequently affected by intermittents. I met with one man of 86, who had all his life been subject to syncope; another, who had for 50 years been occasionally affected by a cough;* and two instances of men, who had been afflicted for forty years with obstinate head-aches.† I met with only one person beyond 80, who had ever been affected by a disease in the *stomach*; and in him it arose from an occasional rupture. Mr. John Strangeways Hutton, of this city, who died in 1793, in the 109th year of his age, informed me, that he had never puked in his life. This circumstance is the more remarkable, as he passed several years at sea when a young man.‡

* This man's only remedy for his cough was the fine powder of dry Indian turnip and honey.

† Dr. Thierry says, that he did not find the itch, or slight degrees of the leprosy, to prevent longevity. *Observations de Physique, et de Medecine faites en differens lieux de L'Espagne.* Vol ii. p. 171.

‡ The venerable old man, whose history first suggested this remark, was born in New York in the year 1684. His grandfather lived to be 101, but was unable to walk for thirty years before he died, from an excessive quantity of fat. His mother died at 91. His constant drinks were water, beer, and cyder. He had a fixed dislike to spirits of all kinds. His appetite was good; and he ate plentifully during the last years of his life. He seldom drank any thing between his meals. He was never intoxicated but twice in his life, and that was when a boy, and at sea, where he remembers perfectly well to have celebrated, by a *feu de joye*, the birthday of queen Anne. He was formerly afflicted with the head-ache and giddiness, but never had a fever, except from the small-pox, in the course

These facts may serve to extend our ideas of the importance of a healthy state of the stomach in the animal economy; and thereby to add to our knowledge in the prognosis of diseases, and in the chances of human life.

9. I have not found the *loss of teeth* to affect the duration of human life, so much as might be expected. Edward Drinker, who lived to be 103 years old, lost his teeth thirty years before he died, from drawing the hot smoke of tobacco into his mouth through a short pipe.

Dr. Sayre, of New-Jersey, to whom I am indebted for several very valuable histories of old persons, mentions one man, aged 81, whose teeth began to decay at 16, and another of 90, who lost his teeth thirty years before he saw him. The gums, by becoming hard, perform, in part, the office of teeth. But may not the gastric juice of the stomach, like the tears and urine, become acrid by age, and thereby supply, by a more dissolving power, the defect of mastication from the loss of teeth? Analogies might easily be adduced from several operations of nature, which go forward in the animal economy, which render this supposition highly probable.

10. I have not observed *baldness*, or *grey hairs*, occurring in early or middle life, to prevent old age. In one of the histories furnished me by Dr. Sayre, I find an account of a man of 81, whose hair began to assume a silver colour when he was but one and twenty years of age.

11. More women live to be old than men, but more men live to be *very* old than women.

I shall conclude this head by the following remark:

Notwithstanding there appears in the human body a certain capacity of long life, which seems to dispose it to preserve its existence in every situation; yet this capacity does not always protect it from premature destruction; for among the old people whom I examined, I scarcely met with one who had not lost brothers or sisters in early and middle life, and who were born under circumstances equally favourable to longevity with themselves.

of his life. His pulse was slow, but regular. He had been twice married. By his first wife he had eight, and by his second seventeen children. One of them lived to be 83 years of age. He was about five feet nine inches in height, of a slender make, and carried an erect head, to the last year of his life.

II. I now come to mention some of the phenomena of the body and mind which occur in old age.

1. There is a great sensibility to *cold* in all old people. I met with an old woman of 84, who slept constantly under three blankets and a coverlet during the hottest summer months. The servant of prince de Beaufremont, who came from Mount Jura to Paris, at the age of 121, to pay his respects to the first national assembly of France, shivered with cold in the middle of the dog-days, when he was not near a good fire. The national assembly directed him to sit with his hat on, in order to defend his head from the cold.

2. Impressions made upon the *ears* of old people excite sensation and reflection much quicker than when they are made upon their eyes. Mr. Hutton informed me, that he had frequently met his sons in the street without knowing them, until they had spoken to him. Dr. Franklin informed me, that he recognized his friends, after a long absence from them, first by their voices. This fact does not contradict the common opinion upon the subject of memory, for the recollection, in these instances, is the effect of what is called reminiscence, which differs from memory in being excited only by the renewal of the impression which at first produced the idea which is revived.

3. The *appetite* for food is generally increased in old age. The famous Parr, who died at 152, ate heartily in the last week of his life. The kindness of nature, in providing this last portion of earthly enjoyments for old people, deserves to be noticed. It is remarkable, that they have, like children, a frequent recurrence of appetite, and sustain with great uneasiness the intervals of regular meals. The observation, therefore, made by Hippocrates, that middle-aged people are more affected by abstinence than those who are old, is not true. This might easily be proved by many appeals to the records of medicine; but old people differ from children, in preferring *solid* to liquid aliment. From inattention to this fact, Dr. Mead has done great mischief by advising old people, as their teeth decayed or perished, to lessen the quantity of their solid, and to increase the quantity of their liquid food. This advice is contrary to nature and experience, and I have heard of

two old persons who destroyed themselves by following it. The circulation of the blood is supported in old people chiefly by the stimulus of aliment. The action of liquids of all kinds upon the system is weak and of short continuance, compared with the durable stimulus of solid food. There is a gradation in the action of this food upon the body. Animal matters are preferred to vegetable, the fat of meat to the lean, and salted meat to fresh, by most old people. I have met with but few old people who retained an appetite for milk. It is remarkable, that a less quantity of *strong drink* produces intoxication in old people than in persons in the middle of life. This depends upon the recurrence of the same state of the system, with respect to excitability, which takes place in childhood. Many old people, from an ignorance of this fact, have made shipwreck of characters, which have commanded respect in every previous stage of their lives. From the same recurrence of the excitability of childhood in their systems, they commonly drink their tea and coffee much weaker than in early or middle life.

4. The *pulse* is generally full, and frequently affected by pauses in its pulsations, when felt in the wrists of old people. A regular pulse in such persons indicates a disease, as it shows the system to be under the impression of a preturnatural stimulus of some kind. This observation was suggested to me above thirty years ago by Morgagni, and I have often profited by it in attending old people. The pulse in such patients is an uncertain mark of the nature, or degree, of an acute disease. It seldom partakes of the quickness or convulsive action of the arterial system, which attends fever in young or middle-aged people. I once attended a man of 77, in a fever of the bilious kind, which confined him for eight days to his bed, in whom I could not perceive the least quickness or morbid action in his pulse until four and twenty hours before he died.

5. The marks of old age appear earlier, and are more numerous, in persons who have combined with hard labour a vegetable or scanty diet, than in persons who have lived under opposite circumstances. I think I have observed these marks of old age to occur sooner, and to be more

numerous, in the German, than in the English or Irish citizens of Pennsylvania. They are likewise more common among the inhabitants of country places, than of cities, and still more so among the Indians of North America, than among the inhabitants of civilized countries.

6. Old men tread upon the *whole base* of their feet at once in *walking*. This is perhaps one reason why they wear out fewer shoes, under the same circumstances of constant use, than young people, who by treading on the posterior, and rising on the anterior part of their feet, expose their shoes to more unequal pressure and friction. The advantage derived to old people from this mode of walking is very obvious. It lessens that disposition to totter, which is always connected with weakness : hence we find the same mode of walking is adopted by habitual drunkards, and is sometimes from habit practised by them, when they are not under the influence of strong drink.

7. The breath and perspiration of old people have a peculiar acrimony, and their urine, in some instances, emits a fœtor of an offensive nature.

8. The eyes of very old people sometimes change from a dark and blue to a light colour.

9. The *memory* is the first faculty of the mind which fails in the decline of life. While recent events pass through the mind without leaving an impression upon it, it is remarkable that the long forgotten events of childhood and youth are recalled and distinctly remembered.

I met with a singular instance of a German woman, who had learned to speak the language of our country after she was forty years of age, who had forgotten every word of it after she had passed her 80th year, but who spoke the German language as fluently as ever she had done. The memory decays soonest in hard drinkers. I have observed some studious men to suffer a decay of their memories, but never of their understandings. Among these was the late Anthony Benezet, of this city. But even this infirmity did not abate the cheerfulness, nor lessen the happiness of this pious philosopher, for he once told me, when I was a young man, that he had a consolation in the decay of his memory, which give him a great advantage over me. " You can read a good book, (said he) with pleasure but *once*,

but when I read a good book, I so soon forget the contents of it, that I have the pleasure of reading it over and over : and every time I read it, it is alike new and delightful to me." The celebrated Dr. Swift was one of those few studious men, who have exhibited marks of a decay of understanding in old age ; but it is judiciously ascribed by Dr. Johnson to two causes, which rescue books, and the exercise of the thinking faculties, from having had any share in inducing that disease upon his mind. These causes were, a rash vow which he made when a young man, never to use spectacles, and a sordid seclusion of himself from company, by which means he was cut off from the use of books, and the benefits of conversation, the absence of which left his mind without its usual stimulus : hence it collapsed into a state of fatuity. It is probably owing to the constant exercise of the understanding, that literary men possess that faculty of the mind in a vigorous state in extreme old age. The same cause accounts for old people preserving their intellects longer in cities than in country places. They enjoy society upon such easy terms in the former situation, that their minds are kept more constantly in an excited state, by the acquisition of new, or the renovation of old ideas, by means of conversation.

10. I did not meet with a single instance, in which the moral or religious faculties were impaired in old people. I do not believe that these faculties of the mind are preserved by any supernatural power, but wholly by the constant and increasing exercise of them in the evening of life. In the course of my inquiries, I heard of a man of 101 years of age, who declared that he had forgotten every thing he had ever known, except his God. I found the moral faculty, or a disposition to do kind offices, to be exquisitely sensible in several old people, in whom there was scarcely a trace left of memory or understanding.

11. Dreaming is universal among old people. It appears to be brought on by their imperfect sleep, of which I shall say more hereafter.

12. I mentioned formerly the sign of a *second childhood*, in the *increase* of the appetite in old people. It appears further,—1. In a recurrence of the appetite for those arti-

cles of food which were most grateful in childhood, particularly sweet substances. The late Dr. Redman, who died in March, 1808, in the 86th year of his age, became so fond of sweet cake, for several years before his death, that he seldom passed a day without eating more or less of it. 2. In the marks which slight contusions or impressions leave upon their skins. 3. In their being soon fatigued by walking or exercise, and in being as soon refreshed by rest. 4. In their loss of the command over their limbs, so as to be unable to protect themselves from the consequences of a fall by protruding their arms. 5. In the loss of their command over the spincters of the rectum and bladder, in consequence of which they discharge their fæces in an involuntary manner, and with the same frequency which we observe in infancy and childhood. I took notice in the lectures upon animal life, of this return of involuntary motions in parts that had become voluntary from the influence of habit. 6. In their inability to rest, except in a recumbent posture. 7. In the absence of teeth. 8. In a disposition to nearly constant sleep. Dr. Haller mentions an instance of a very old man, who slept twenty out of every twenty-four hours of the last years of his life. 9. In their disposition, like children, to detail immediately every thing they see and hear. 10. In their aptitude to shed tears; hence they are unable to tell a story, that is in any degree distressing, without weeping. Dr. Moore takes notice of this peculiarity in Voltaire, after he had passed his 80th year. He wept constantly at the recital of his own tragedies. This feature in old age did not escape Homer. Old Menelaus wept ten years after he returned from the destruction of Troy, when he spoke of the death of the heroes who perished before that city. The famous duke of Marborough discovered the same disposition to weep in the close of his life. 11. In the absence of memory, and finally, in the extinction of every other faculty of the mind. The reader will perceive here, that not only the marks of a second childhood, but of a second infancy, are exhibited in old age, when it is protracted to its extreme point.

13. The disposition in the system to *renew* certain parts in extreme old age has been mentioned by several authors.

Many instances are to be met with in the records of medicine of the sight* and hearing having been restored; and even of the teeth having been renewed in old people a few years before death. These phenomena have led me to suspect that the antediluvian age was attained by the frequent renovation of different parts of the body, and that when they occur, they are an effort of the causes which support animal life to produce antediluvian longevity, by acting upon the revived excitability of the system.

14. The *fear* of death appears to be much less in old age, than in early or middle life. I met with many old people who spoke of their dissolution with composure, and with some who expressed earnest desires to lie down in the grave. This indifference to life, and desire for death (whether they arise from a satiety in worldly pursuits and pleasures, or from a desire of being relieved from pain) appears to be a wise law in the animal economy, and worthy of being classed with those laws which accommodate the body and mind of man to all the natural evils, to which, in the common order of things, they are necessarily exposed.

III. I come now to briefly enumerate the diseases of old age, and the remedies which are most proper to remove, or to mitigate them.

The diseases are chronic and acute. The CHRONIC are,

1. *Weakness* of the *knees* and *ankles*, a lessened ability to walk, and tremors in the head and limbs.

2. *Pains in the bones*, known among nosological writers by the name of rheumatism.

* There is a remarkable instance of the sight having been restored, after it had been totally destroyed, in an old man near Reading, in Pennsylvania. My brother, Judge Rush, furnished me with the following account of him, in a letter from Reading, dated June 23, 1792.

"An old man, of 84 years of age, of the name of Adam Riffle, near this town, gradually lost his sight in the 68th year of his age, and continued entirely blind for the space of twelve years. About four years ago his sight returned, without making use of any means for the purpose, and without any visible change in the appearance of the eyes, and he now sees as well as ever he did. I have seen the man, and have no doubt of the fact. He is at this time so hearty, as to be able to walk from his house to Reading (about three miles) which he frequently does in order to attend church. I should observe, that, during both the gradual loss and recovery of his sight, he was no ways affected by sickness, but on the contrary, enjoyed his usual health. I have this account from his daughter and son-in-law, who live within a few doors of me."

3. *Involuntary flow of tears*, and of mucous from the nose.

4. *Difficulty of breathing*, and a short cough, with copious expectoration. A weak or hoarse voice generally attends this cough.

5. *Costiveness*.

6. An *inability to retain the urine* as long as in early or middle life. Few persons beyond 60 pass a whole night, without being obliged to discharge their urine.* Perhaps the stimulus of this liquor in the bladder may be one cause of the universality of dreaming among old people. It is certainly a frequent cause of dreaming in persons in early and middle life : this I infer, from its occurring chiefly in the morning, when the bladder is most distended with urine. There is likewise an inability in old people to discharge their urine as quickly as in early life. I think I have observed this to be among the first symptoms of the declension of the strength of the body by age.

7. *Wakefulness*. This is probably produced in part by the action of the urine upon the bladder ; but such is the excitability of the system in the first stages of old age, that there is no pain so light, no anxiety so trifling, and no sound so small, as not to produce wakefulness in old people. It is owing to their imperfect sleep, that they are sometimes as unconscious of the moment of their passing from a sleeping to a waking state, as young and middle-aged people are of the moment in which they pass from the waking to a sleeping state. Hence we so often hear them complain of passing sleepless nights. This is no doubt frequently the case, but I am satisfied, from the result of an inquiry made upon this subject, that they often sleep without knowing it, and that their complaints in the morning, of the want of sleep, arise from ignorance, without the least intention to deceive.

8. *Giddiness*.

9. *Deafness*.

10. *Imperfect vision*.

The acute diseases most common among old people are,—

1. *Inflammation of the eyes*.

2. The *pneumonia notha*, or bastard peripneumony.

* I met with an old man, who informed me, that if from any accident he retained his urine after he felt an inclination to discharge it, he was affected by numbness, accompanied by an uneasy sensation in the palms of his hands.

3. The *colic*.
4. *Palsy* and *apoplexy*.
5. The *piles*.
6. A *difficulty* in *making water*.
7. *Quartan fever*.

All the diseases of old people, both chronic and acute, originate in predisposing debility. The remedies for the former, where a feeble morbid action takes place in the system, are stimulants. The first of these is,—

1. **HEAT.** The ancient Romans prolonged life by retiring to Naples, as soon as they felt the infirmities of age coming upon them. The aged Portuguese imitate them, by approaching the warm sun of Brazil, in South America. But heat may be applied to the torpid bodies of old people artificially. 1. By means of the *warm bath*. Dr Franklin owed much of the cheerfulness and general vigour of body and mind, which characterised his old age, to his regular use of this remedy. It disposed him to sleep, and even produced a respite from the pain of the stone, with which he was afflicted during the last years of his life.

2. Heat may be applied to the bodies of old people by means of *stove rooms*. The late Dr. Dewit, of Germantown, who lived to be near 100 years of age, seldom breathed an air below 72°, after he had become an old man. He lived constantly in a stove room.

3. **WARM CLOTHING**, more especially warm bed clothes, are proper to preserve or increase the heat of old people. From the neglect of the latter, they are often found dead in their beds in the morning, after a cold night, in all cold countries. The late Dr. Chovet, of this city, who lived to be 85, slept in a baize night gown, under eight blankets and a coverlet, in a stove room, many years before he died. The head should be defended in old people, by means of woollen or fur caps in the night, and by wigs and hats during the day, in cold weather. These artificial coverings will be the more necessary, where the head has been deprived of its natural covering. Great pains should be taken likewise to keep the feet dry and warm, by means of thick shoes.* To these modes of ap-

* I met with one man above 80, who defended his feet from moisture by covering his shoes in wet weather with melted wax; and another,

plying and confining heat to the bodies of old people, a young bed-fellow has been added; but I conceive the three artificial modes which have been recommended will be sufficient, without the use of one, which cannot be successfully employed without a breach of delicacy or humanity.

II. To keep up the action of the system, *GENEROUS DIET* and *DRINKS* should be given to old people. Their food should partake largely of the fire, and it should be so cooked as to retain all its juices. By this means it is more easily divided by their gums, and more easily digested. Broiled fish, and what are commonly called stews of butcher's meat, form excellent articles of diet for old people. For a reason mentioned formerly, they should be indulged in eating between the ordinary meals of families. Wine should be given to them in moderation. It has been emphatically called the milk of old age.

III. *YOUNG COMPANY* should be preferred by old people to the company of persons of their own age. I think I have observed old people to enjoy better health and spirits, when they have passed the evening of their lives in the families of their children, where they have been surrounded by grand-children than when they lived by themselves. Even the solicitude they feel for the welfare of their descendants contributes to invigorate the circulation of the blood, and thereby to add fuel to the lamp of life.

IV. *GENTLE EXERCISE*. This is of great consequence in promoting the health of old people. It should be moderate, regular, and always in fair weather.

V. *CLENLINESS*. This should by no means be neglected. The dress of old people should not only be clean, but more elegant than in youth, or middle life. It serves to divert the eye of spectators from observing the decay and deformity of the body, to view and admire that which is always agreeable to it.

who, for the same purpose, covered his shoes every morning with a mixture composed of the following ingredients melted together: linseed oil, a pound, mutton suet eight ounces, bee's-wax six ounces, and rosin four ounces. This mixture should be moderately warmed, and then applied not only to the upper leather, but to the soles of the shoes. This composition, the old gentleman informed me, was extracted from a book, entitled "The Complete Fisherman," published in England, in the reign of queen Elizabeth. He had used it for twenty years in cold and wet weather, with great benefit, and several of his friends, who had tried it, spoke of its efficacy in keeping the feet dry in high terms.

VI. To abate the pains of the chronic rheumatism, and the uneasiness of the old man's cough (as it is called;) also to remove wakefulness, and to restrain, during the night, a troublesome inclination to make water, *OPIMUM* may be given with great advantage. Chardin informs us, that this medicine is frequently used in the eastern countries, to abate the pains and weaknesses of old age, by those people who are debarred the use of wine by the religion of Mahomet.

I have nothing to say upon the acute diseases of old people, but what is to be found in most of our books of medicine, except to recommend *BLEEDING* in those of them which are attended with plethora, and an inflammatory action in the pulse. The degrees of appetite which belong to old age, the quality of the food taken, and the sedentary life which is generally connected with it, all concur to produce that state of the system, which requires the above evacuation. I am sure that I have seen many of the chronic complaints of old people mitigated by it, and I have more than once seen it used with obvious advantage in their inflammatory diseases. These affections I have observed to be more fatal among old people than is generally supposed. An inflammation of the lungs, which terminated in an abscess, deprived the world of Dr. Franklin. Dr. Chovet died of an inflammation in his liver. The blood drawn from him a few days before his death was sizy, and such was the heat of his body, produced by his fever, that he could not bear more covering (notwithstanding his former habits of warm clothing) than a sheet in the month of January.

Death from old age is the effect of a gradual palsy. It shows itself first in the eyes and ears, in the decay of sight and hearing; it appears next in the urinary bladder, in the limbs and trunk of the body; then in the sphincters of the bladder and rectum; and finally in the nerves and brain, destroying, in the last, the exercise of all the faculties of the mind.

Few persons appear to die of old age. Some one of the diseases which have been mentioned generally cuts the last thread of life.

OBSERVATIONS
ON THE
DUTIES OF A PHYSICIAN,
AND
THE METHODS OF IMPROVING MEDICINE.
ACCOMMODATED TO THE PRESENT STATE
OF
SOCIETY AND MANNERS
IN THE
UNITED STATES.

Delivered in the University of Pennsylvania, February 7, 1789, at the conclusion
of a course of lectures upon chemistry and the practice of physic.

PUBLISHED AT THE REQUEST OF THE CLASS.

OBSERVATIONS, &c.

GENTLEMEN,

I SHALL conclude our course of lectures, by delivering to you a few directions for the regulation of your future conduct and studies, in the line of your profession.

I shall, *first*, suggest the most probable means of establishing yourselves in business, and of becoming acceptable to your patients, and respectable in life.

Secondly, I shall mention a few thoughts which have occurred to me on the mode to be pursued, in the further prosecution of your studies, and for the improvement of medicine.

I. Permit me, in the first place, to recommend to such of you as intend to settle in the country, to establish yourselves as early as possible upon *farms*. My reasons for this advice are as follow :

1. It will reconcile the country people to the liberality and dignity of your profession, by shewing them that you assume no superiority over them from your education, and that you intend to share with them in those toils, which were imposed upon man in consequence of the loss of his innocence. This will prevent envy, and render you acceptable to your patients as men, as well as physicians.

2. By living on a farm you may serve your country, by promoting improvements in agriculture. Chemistry (which is now an important branch of medical education) and agriculture are closely allied to each other. Hence some of the most useful books upon agriculture have been written by physicians. Witness the essays of Dr. Home

of Edinburgh, and of Dr. Hunter of Yorkshire, in England.

3. The business of a farm will furnish you with employment in the healthy seasons of the year, and thereby deliver you from the *tædium vitæ*, or what is worse, from retreating to low or improper company. Perhaps one cause of the prevalence of dram or grog drinking, with which country practitioners are sometimes charged, is owing to their having no regular or profitable business to employ them in the intervals of their attendance upon their patients.

4. The resources of a farm will create such an independence, as will enable you to practice with more dignity, and at the same time screen you from the trouble of performing unnecessary services to your patients. It will change the nature of the obligation between you and them. While *money* is the only means of your subsistence, your patients will feel that they are the channels of your daily bread; but while your farm furnishes you with the necessities of life, your patients will feel more sensibly, that the obligation is on their side, for health and life.

5. The exigencies and wants of a farm, in *stock* and *labour* of all kinds, will enable you to obtain from your patients a compensation for your services in those articles. They all possess them, and men part with that of which money is only the sign much more readily than they do with money itself.

6. The resources of a farm will prevent your cherishing, for a moment, an impious wish for the prevalence of sickness in your neighbourhood. A healthy season will enable you to add to the produce of your farm, while the rewards of an unhealthy season will enable you to repair the inconvenience of your necessary absence from it. By these means your pursuits will be marked by that *variety* and *integrity*, in which true happiness is said to consist.

7. Let your farms be small, and let your *principal* attention be directed to grass and horticulture. These afford most amusement, require only moderate labour, and will interfere least with your duties to your profession.

II. Avoid singularities of every kind in your manners, dress, and general conduct. Sir Isaac Newton, it is said,

could not be distinguished in company, by any peculiarity, from a common well bred gentlemen. Singularity, in any thing, is a substitute for such great or useful qualities as command respect ; and hence we find it chiefly in little minds. The profane and indelicate combination of extravagant ideas, improperly called wit, and the formal and pompous manner, whether accompanied by a wig, a cane, or a ring, should be all avoided, as incompatible with the simplicity of science, and the real dignity of physic. There is more than one way of playing the quack. It is not necessary, for this purpose, that a man should advertise his skill, or his cures, or that he should mount a phaeton, and display his dexterity in operating to an ignorant and gaping multitude. A physician acts the same part in a different way, who assumes the character of a madman or a brute in his manners, or who conceals his fallibility by an affected gravity and taciturnity in his intercourse with his patients. Both characters, like the quack, impose upon the public. It is true, they deceive different ranks of people ; but we must remember that there are two kinds of vulgar, viz. the rich and the poor ; and that the rich vulgar are often upon a footing with the poor, in ignorance and credulity.

III. It has been objected to our profession, that many eminent physicians have been unfriendly to Christianity.

If this be true, I cannot help ascribing it in part to that neglect of public worship, with which the duties of our profession are often incompatible ; for it has been justly observed, that the neglect of this religious and social duty generally produces a relaxation, either in principles or morals. Let this fact lead you, in setting out in business, to acquire such habits of punctuality in visiting your patients, as shall not interfere with acts of public homage to the Supreme Being. Dr. Gregory has observed, that a cold heart is the most frequent cause of deism. Where this occurs in a physician, it affords a presumption that he is deficient in humanity. But I cannot admit that infidelity is peculiar to our profession. On the contrary, I believe Christianity places among its friends more men of extensive abilities and learning in medicine, than in any other secular employment. Stahl, Hoffman, Boerhaave, Sydenham, Haller, and Fothergill, were all Christians. These

enlightened physicians were considered as the ornaments of the ages in which they lived, and posterity has justly ranked them among the greatest benefactors of mankind.

IV. Permit me to recommend to you a regard to all the interests of your country. The education of a physician gives him a peculiar insight in the principles of many useful arts, and the practice of physic favours his opportunities of doing good, by diffusing knowledge of all kinds. It was in Rome, when medicine was practised only by slaves, that physicians were condemned by their profession "*mutam exercere artem.*" But in modern times, and in free governments, they should disdain an ignoble silence upon public subjects. The American revolution has rescued physic from its former slavish rank in society. For the honour of our profession it should be recorded, that some of the most intelligent and useful characters, both in the cabinet and the field, during the late war, have been physicians. The illustrious Dr. Fothergill opposed faction and tyranny, and took the lead in all public improvements in his native country, without suffering thereby the least diminution of that reputation, or business, in which, for forty years, he flourished almost without a rival in the city of London.

V. Let me advise you, in your visits to the sick, *never* to appear in a hurry, nor to talk of indifferent matters, before you have made the necessary inquiries into the symptoms of your patients disease.

VI. Avoid making light of any case, "*Respice finem*" should be the motto of every indisposition. There is scarcely a disease so trifling, that has not directly or indirectly, proved an outlet to human life. This consideration should make you anxious and punctual in your attendance upon every acute disease, and keep you from risking your reputation by an improper or hasty prognosis.

VII. Do not condemn or oppose, unnecessarily, the simple prescriptions of your patients. Yield to them in matters of little consequence, but maintain an inflexible authority over them in matters that are essential to life.

VIII. Preserve, upon all occasions, a composed or cheerful countenance in the room of your patients, and inspire as much hope of a recovery as you can, consistent

with truth, especially in acute diseases. The extent of the influence of the will over the human body has not yet been fully ascertained. I reject the futile pretensions of Mr. Mesmer to the cure of diseases, by what he has absurdly called animal magnetism. But I am willing to derive the same advantages from his deceptions, which the chemists have derived from the delusions of alchemists. The facts which he has established clearly prove the influence of the imagination, and will, upon diseases. Let us avail ourselves of the handle which those faculties of the mind present to us, in the strife between life and death. I have frequently prescribed remedies of doubtful efficacy in the critical stage of acute diseases, but never till I had worked up my patients into a confidence, bordering upon certainty, of their probable good effects. The success of this measure has much oftener answered, than disappointed my expectations; and while my patients have commended the vomit, the purge, or the blister, which was prescribed, I have been disposed to attribute their recovery to the vigorous concurrence of the *will* in the action of the medicine. Does the will beget insensibility to cold, heat, hunger, and danger? Does it suspend pain, and raise the body above feeling the pangs of Indian tortures? Let us not then be surprised that it should enable the system to resolve a spasm, to open an obstruction, or to discharge an offending humour. I have only time to hint at this subject. Perhaps it would lead us, if we could trace it fully to some very important discoveries in the cure of diseases.

IX. Permit me to advise you, in your intercourse with your patients, to attend to that principle in the human mind, which constitutes the association of ideas. A chamber, a chair, a curtain, or even a cup, all belong to the means of life or death, accordingly as they are associated with cheerful or distressing ideas, in the mind of a patient. But this principle is of more immediate application in those chronic diseases which affect the mind. Nothing can be accomplished here, till we produce a new association of ideas. For this purpose a change of place and company are absolutely necessary. But we must sometimes proceed much further. I have heard of a gentleman

in South Carolina, who cured his fits of low spirits by changing his clothes. The remedy was a rational one. It produced at once a new train of ideas, and thus removed the paroxysm of his disease.

X. Make it a rule never to be angry at any thing a sick man says or does to you. Sickness often adds to the natural irritability of the temper. We are, therefore, to bear the reproaches of our patients with meekness and silence. It is folly to resent injuries at any time, but it is cowardice to resent an injury from a sick man, since, from his weakness and dependence upon us, he is unable to contend with us upon equal terms. You will find it difficult to attach your patients to you by the obligations of friendship or gratitude. You will sometimes have the mortification of being deserted by those patients, who owe most to your skill and humanity. This led Dr. Turner to advise physicians never to choose their friends from among their patients. But this advice can never be followed by a heart that has been taught to love true excellency, wherever it finds it. I would rather advise you to give the benevolent feelings of your hearts full scope, and to forget the unkind returns they will often meet with, by giving to human nature—a tear.

XI. Avoid giving a patient over in an acute disease. It is impossible to tell in such cases where life ends, and where death begins. Hundreds of patients have recovered, who have been pronounced incurable, to the great disgrace of our profession. I know that the practice of predicting danger and death, upon every occasion, is sometimes made use of by physicians, in order to enhance the credit of their prescriptions, if their patients recover, and to secure a retreat from blame, if they should die. But this mode of acting is mean and illiberal. It is not necessary that we should decide with confidence, at any time, upon the issue of a disease.

XII. A physician in sickness is always a welcome visitor in a family; hence he is often solicited to partake of the usual sign of hospitality in this country, by taking a draught of strong liquor, every time he enters into the house of a patient. Let me charge you to lay an early restraint upon yourselves, by refusing to yield to this practice,

especially in the *forenoon*. Many physicians have been innocently led by it into habits of drunkenness. You will be in the more danger of falling into this vice, from the great fatigue and inclemency of the weather to which you will be exposed in country practice. But you have been taught that strong drink affords only a temporary relief from those evils, and that it afterwards renders the body more sensible of them.

XIII. I shall now give some directions with respect to the method of charging for your services to your patients.

When we consider the expense of a medical education, and the sacrifices a physician is obliged to make of ease society and even health, to his profession; and when we add to these, the constant and painful anxiety which is connected with the important charge of the lives of our fellow-creatures, and, above all, the inestimable value of that blessing which is the object of his services, I hardly know how it is possible for a patient sufficiently and justly to reward his physician. But when we consider, on the other hand, that sickness deprives men of the means of acquiring money; that it increases all the expenses of living; and that high charges often drive patients from regular-bred physicians to quacks; I say, when we attend to these considerations, we should make our charges as moderate as possible, and conform them to the following state of things.

Avoid measuring your services to your patients by scruples, drachms, and ounces. It is an illiberal mode of charging. On the contrary, let the number and *time* of your visits, the nature of your patient's disease, and his rank in his family or society, determine the figures in your accounts. It is certainly just, to charge more for curing an apoplexy, than an intermitting fever. It is equally just, to demand more for risking your life by visiting a patient in a contagious fever, than for curing a pleurisy. You have likewise a right to be paid for your anxiety. Charge the same services, therefore, higher, to the master or mistress of a family, or to an only son or daughter, who call forth all your feelings and industry, than to less important members of a family and of society. If a rich man demand more frequent visits than are necessary, and if he

impose the restraints of keeping to hours, by calling in other physicians to consult with you upon every trifling occasion, it will be just to make him pay accordingly for it. As this mode of charging is strictly agreeable to reason and equity, it seldom fails of according with the reason and sense of equity of our patients. Accounts made out upon these principles are seldom complained of by them. I shall only remark further upon this subject, that the sooner you send in your accounts after your patients recover, the better. It is the duty of a physician to inform his patient of the amount of his obligation to him at least *once* a year. But there are times when a departure from this rule may be necessary. An unexpected misfortune in business, and a variety of other accidents, may deprive a patient of the money he had allotted to pay his physician. In this case, delicacy and humanity require, that he should not know the amount of his debt to his physician, till time had bettered his circumstances.

I shall only add, under this head, that the poor of every description should be the objects of your peculiar care. Dr. Boerhaave used to say, "they were his best patients, because God was their paymaster." The first physicians that I have known have found the poor the steps, by which they have ascended to business and reputation. Diseases among the lower class of people are generally simple, and exhibit to a physician the best cases of all epidemics, which cannot fail of adding to his ability of curing the complicated diseases of the rich and intemperate. There is an inseparable connection between a man's duty and his interest. Whenever you are called, therefore, to visit a poor patient, imagine you hear the voice of the good Samaritan sounding in your ears, "Take care of him, and I will repay thee."

I come now to the second part of this address, which was to point out the best mode to be pursued, in the further prosecution of your studies, and the improvement of medicine.

1. Give me leave to recommend to you, to open all the dead bodies you can, without doing violence to the feelings of your patients, or the prejudices of the common people. Preserve a register of the weather, and of its in-

fluence upon the vegetable productions of the year. Above all, record the epidemics of every season; their times of appearing and disappearing, and the connection of the weather with each of them. Such records if published, will be useful to foreigners, and a treasure to posterity. Preserve, likewise, an account of chronic cases. Record the name, age, and occupation of your patient; describe his disease accurately, and the changes produced in it by your remedies; mention the doses of every medicine you administer to him. It is impossible to tell how much improvement and facility in practice you will find from following these directions. It has been remarked, that physicians seldom remember more than the two or three last years of their practice. The records which have been mentioned will supply this deficiency of memory, especially in that advanced stage of life, when the advice of physicians is supposed to be most valuable.

II. Permit me to recommend to you further, the study of the anatomy (if I may be allowed the expression) of the human mind, commonly called metaphysics. The reciprocal influence of the body and mind upon each other can only be ascertained by an accurate knowledge of the faculties of the mind, and of their various modes of combination and action. It is the duty of physicians to assert their prerogative, and to rescue the mental science from the usurpations of schoolmen and divines. It can only be perfected by the aid and discoveries of medicine. The authors I would recommend to you upon metaphysics are, Butler, Locke, Hartley, Reid, and Beattie. These ingenious writers have cleared this sublime science of its technical rubbish, and rendered it both intelligible and useful.

III. Let me remind you, that improvement in medicine is not to be derived only from colleges and universities. Systems of physic are the productions of men of genius and learning; but those facts which constitute real knowledge are to be met with in every walk of life. Remember how many of our most useful remedies have been discovered by quacks. Do not be afraid, therefore, of conversing with them, and of profiting by their ignorance and temerity in the practice of physic. Medicine has its Pharisees, as well as religion. But the spirit of this sect is

as unfriendly to the advancement of medicine, as it is to Christian charity. By conversing with quacks, we may convey instruction to them, and thereby lessen the mischief they might otherwise do to society. But further. In the pursuit of medical knowledge, let me advise you to converse with nurses and old women. They will often suggest facts in the history and cure of diseases, which have escaped the most sagacious observers of nature. Even Negroes and Indians have sometimes stumbled upon discoveries in medicine. Be not ashamed to inquire into them. There is yet one more means of information in medicine which should not be neglected, and that is, to converse with persons who have recovered from indispositions without the aid of physicians. Examine the strength and exertions of nature in these cases, and mark the plain and home-made remedy to which they ascribe their recovery. I have found this to be a fruitful source of instruction, and have been led to conclude, that if every man in a city, or a district, could be called upon to relate, to persons appointed to receive and publish his narrative, an exact account of the effects of those remedies which accident or whim has suggested to him, it would furnish a very useful book in medicine. To preserve the facts thus obtained, let me advise you to record them in a book to be kept for that purpose. There is one more advantage that will probably attend the inquiries that have been mentioned; you may discover diseases, or symptoms of diseases, or even laws of the animal economy, which have no place in our systems of nosology, or in our theories of physic.

IV. Study simplicity in the preparation of your medicines. My reasons for this advice are as follow :

1. Active medicines produce the most certain effects in a simple state.

2. Medicines when mixed frequently destroy the efficacy of each other. I do not include chemical medicines alone in this remark. It applies likewise to Galenical medicines. I do not say that all these medicines are impaired by mixture, but we can only determine when they are not, by actual experiments and observations.

3. When medicines of the same class, or even of different classes, are given together, the *strongest* only produces an effect. But what are we to say to a compound

of two medicines, which give exactly the same impression to the system? Probably, if we are to judge from analogy the effect of them will be such, as would have been produced by neither in a simple state.

4. By observing simplicity in your prescriptions, you will always have the command of a greater number of medicines of the *same* class, which may be used in succession to each other, in proportion as habit renders the system insensible of their action.

5. By using medicines in a simple state, you will obtain an exact knowledge of their virtues and doses, and thereby be able to decide upon the numerous and contradictory accounts which exist in our books, of the character of the *same* medicines.

Under this head, I cannot help adding two more directions.

1. Avoid sacrificing too much to the *taste* of your patients in the preparation of your medicines. The nature of a medicine may be wholly changed, by being mixed with sweet substances. The Author of Nature seems to have had a design, in rendering medicines unpalatable. Had they been more agreeable to the taste, they would probably have yielded long ago to the unbounded appetite of man, and by becoming articles of diet, or condiments, have lost their efficacy in diseases.

2. Give as few medicines as possible in tinctures made with distilled spirits. Perhaps there are few cases in which it is safe to exhibit medicines prepared in spirits in any other form than in *drops*. Many people have been innocently seduced into a love of strong drink, from taking large or frequent doses of bitters infused in spirits. Let not our profession be reproached in a single instance, with adding to the calamities that have been entailed upon mankind by this dreadful species of intemperance.

V. Let me recommend to your particular attention the indigenous, medicines of our country. Cultivate or prepare as many of them as possible, and endeavour to enlarge the materia medica, by exploring the untrodden fields and forests of the United States. The ipecacuanha, the Seneka and Virginia snake-roots, the Carolina pink-root, the spice-wood, the sassafras, the butter-nut, the thoroughwort, the poke, and the stramonium, are but a smal

part of the medical productions of America. I have no doubt but there are many hundred other plants, which now exhale invaluable medicinal virtues in the desert air. Examine, likewise, the mineral waters, which are so various in their impregnation, and so common in all parts of our country. Let not the properties of the insects of America escape your investigation. We have already discovered among some of them a fly, equal in its blistering qualities to the famous fly of Spain. Who knows but it may be reserved for America to furnish the world, from her productions, with cures for some of those diseases which now elude the power of medicine? Who knows but that, at the foot of the Allegany mountain there blooms a flower, that is an infallible cure for the epilepsy? Perhaps on the Monongahela, or the Potomac, there may grow a root, that shall supply, by its tonic powers, the invigorating effects of the savage or military life in the cure of consumptions. Human misery of every kind is evidently on the decline. Happiness, like truth, is a unit. While the world, from the progress of intellectual, moral, and political truth, is becoming a more safe and agreeable abode for man, the votaries of medicine should not be idle. All the doors and windows of the temple of nature have been thrown open, by the convulsions of the late American revolution. This is the time, therefore, to press upon her altars. We have already drawn from them discoveries in morals, philosophy, and government; all of which have human happiness for their object. Let us preserve the unity of truth and happiness, by drawing from the same source, in the present critical moment, a knowledge of antidotes to those diseases which are supposed to be incurable.

I have now, gentlemen, only to thank you for the attention, with which you have honoured the course of lectures which has been delivered to you, and to assure you, that I shall be happy in rendering you all the services that lie in my power, in any way you may be pleased to command me. Accept of my best wishes for your happiness, and may the blessings of hundreds and thousands, that were ready to perish, be your portion in life, your comfort in death, and your reward in the world to come.

THE END OF VOLUME I.

MEDICAL INQUIRIES

AND

OBSERVATIONS.

BY BENJAMIN RUSH, M. D.

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PRACTICE, IN THE UNIVERSITY OF PENNSYLVANIA.

FOUR VOLUMES IN TWO.

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AN ACCOUNT
OF THE
CLIMATE OF PENNSYLVANIA,
AND ITS
INFLUENCE UPON THE HUMAN BODY.

VOL. II.

A

AN ACCOUNT

OF THE

CLIMATE OF PENNSYLVANIA, &c.

IN order to render the observations upon the epidemic diseases which compose the following volumes more useful, it will be necessary to prefix to them a short account of the climate of Pennsylvania, and of its influence upon the human body. This account may perhaps serve further, to lead to future discoveries, and more extensive observations, upon this subject.

The state of Pennsylvania lies between $39^{\circ} 43' 25''$, and 42° north latitude, including, of course, $2^{\circ} 16' 35''$, equal to 157 miles from its southern to its northern boundary: The western extremity of the state is in the longitude of $5^{\circ} 23' 0''$, and the eastern, is that of 27° from the meridian of Philadelphia, comprehending in a due west course 311 miles exclusive of the territory lately purchased by Pennsylvania from the United States, of which as yet no accurate surveys have been obtained. The state is bounded on the south by part of the state of Delaware, by the whole state of Maryland, and by Virginia to her western extremity. The last named state, the territory lately ceded to Connecticut, and Lake Erie, (part of which is included in Pennsylvania) form the western and north-western boundaries of the state. Part of New York, and the territory lately ceded to Pennsylvania, with a part of Lake Erie, compose the northern, and another part of New York, with a large extent of New Jersey (separated from Pennsylvania by the river Delaware) compose the eastern boundaries of the state. The lands which form these boundaries (except a part of the states of Delaware, Maryland, and New Jersey) are in a state of nature. A large

tract of the western and north eastern parts of Pennsylvania are nearly in the same uncultivated situation.

The state of Pennsylvania is intersected and diversified with numerous rivers and mountains. To describe, or even to name them all, would far exceed the limits I have proposed to this account of our climate. It will be sufficient only to remark, that one of these rivers, viz. the Susquehannah, begins at the northern boundary of the state, twelve miles from the river Delaware and winding several hundred miles, through a variegated country, enters the state of Maryland on the southern line, fifty-eight miles westward of Philadelphia; that each of these rivers is supplied by numerous streams of various sizes; that tides flow in parts of two of them, viz. in the Delaware and Schuylkill; that the rest rise and fall internately in wet and dry weather; and that they descend with great rapidity, over prominent beds of rocks in many places, until they empty themselves into the bays of Delaware and Chesapeake on the east, and into the Ohio on the western part of the state.

The mountains form a considerable part of the state of Pennsylvania. Many of them appear to be reserved as perpetual marks of the original empire of nature in this country. The Allegany, which crosses the state about two hundred miles from Philadelphia, in a north inclining to an eastern course, is the most considerable and extensive of these mountains. It is called by the Indians the back-bone of the continent. Its height, in different places, is supposed to be about 1,300 feet from the adjacent plains.

The soil of Pennsylvania is diversified by its vicinity to mountains and rivers. The valleys and bottoms consist of a black mould, which extends from a foot to four feet in depth. But in general a deep clay forms the surface of the earth. Immense beds of limestone lie beneath this clay in many parts of the state. This account of the soil of Pennsylvania is confined wholly to the lands on the east side of the Allegany mountain. The soil on the west side of this mountain, shall be described in another place.

The city of Philadelphia lies in the latitude of $39^{\circ} 57'$, in longitude $75^{\circ} 8'$ from Greenwich, and fifty-five miles west from the Atlantic ocean.

It is situated about four miles due north from the conflux of the rivers Delaware and Schuylkill. The buildings, which consist chiefly of brick, extend nearly three miles north and south along the Delaware, and above half a mile due west towards the Schuylkill, to which river the limits of the city extend, the whole of which includes a distance of two miles from the Delaware. The land near the rivers, between the city and the conflux of the rivers, is in general low, moist, and subject to be overflowed. The greatest part of it is meadow ground. The land to the northward and westward, in the vicinity of the city, is high, and in general well cultivated. Before the year 1778, the ground between the present improvements of the city, and the river Schuylkill, was covered with woods. These, together with large tracts of wood to the northward of the city, were cut down during the winter the British army had possession of Philadelphia. I shall hereafter mention the influence which the cutting down of these woods, and the subsequent cultivation of the grounds in the neighbourhood of the city, have had upon the health of its inhabitants.

The mean height of the ground on which the city stands, is about forty feet above the river Delaware. One of the longest and most populous streets in the city rises only a few feet above the river. The air at the north is much purer than at the south end of the city; hence the lamps exhibit a fainter flame in its southern, than its northern parts.

The tide of the Delaware seldom rises more than six feet. It flows four miles in an hour. The width of the river near the city is about a mile.

The city, with the adjoining districts of Southwark and the Northern Liberties, contains between 90 and 100,000 inhabitants.

From the accounts which have been handed down to us by our ancestors, there is reason to believe that the climate of Pennsylvania has undergone a material change. Thunder and lightning are less frequent, and the cold of our winters and heat of our summers are less uniform, than they were forty or fifty years ago. Nor is this all. The springs are much colder, and the autumns more

temperate than formerly, insomuch that cattle are not housed so soon by one month as they were in former years. Within the last eight years, there have been some exceptions to part of these observations. The winter of the year 1779-80, was uniformly and uncommonly cold. The river Delaware was frozen near three months during this winter, and public roads for wagons and sleighs connected the city of Philadelphia in many places with the Jersey shore. The thickness of the ice in the river near the city, was from sixteen to nineteen inches, and the depth of the frost in the ground was from four to five feet, according to the exposure of the ground, and the quality of the soil. This extraordinary depth of the frost in the earth compared with its depth in more northern and colder countries, is occasioned by the long delay of snow, which leaves the earth without a covering during the last autumnal and the first winter months. Many plants were destroyed by the intenseness of the cold during this winter. The ears of horned cattle, and the feet of hogs exposed to the air, were frost-bitten; squirrels perished in their holes, and partridges were often found dead in the neighbourhood of farm-houses. The mercury in January stood for several hours at 5° below 0, in Fahrenheit's thermometer; and during the whole of this month (except on one day,) it never rose in the city of Philadelphia so high as to the freezing point.

The cold, in the winter of the year 1783-4, was as intense, but not so steady, as it was in the winter that has been described. It differed from it materially in one particularly, viz. there was a thaw in the month of January, which opened all our rivers for a few days.

The summer which succeeded the winter of 1779-80, was uniformly warm. The mercury in the thermometer, during this summer, stood on one day (the 15th of August) at 95° , and fluctuated between 93° and 80° , for many weeks. The thermometer, in every reference that has been, or shall be made to it, stood in the shade in the open air.

I know it has been said by many old people, that the winters in Pennsylvania are less cold, and the summers less warm, than they were forty or fifty years ago. The want of thermometrical observations before, and during those years, renders it difficult to decide this question.

Perhaps the difference of clothing and sensation between youth and old age, in winter and summer, may have laid the foundation of this opinion. I suspect the mean temperature of the air in Pennsylvania has not altered, but that the principal change in our climate consists in the heat and cold being less confined than formerly to their natural seasons. I adopt the opinion of Dr. Williamson* respecting the diminution of the cold in the southern, being occasioned by the cultivation of the northern parts of Europe; but no such cultivation has taken place in the countries which lie to the north-west of Pennsylvania, nor do the partial and imperfect improvements which have been made in the north-west parts of the state, appear to be sufficient to lessen the cold, even in the city of Philadelphia. I have been able to collect no facts, which dispose me to believe that the winters were colder before the year 1740, than they have been since. In the memorable winter of 1739-40, the Delaware was crossed on the ice, in sleighs, on the 5th of March, old style, and did not open till the 13th of the same month. The ground was covered during this winter with a deep snow, and the rays of the sun were constantly obscured by a mist, which hung in the upper regions of the air. In the winter of 1779-80, the river was navigable on the 4th of March; the depth of the snow was moderate, and the gloominess of the cold was sometime suspended for a few days by a cheerful sun. From these facts, it is probable the winter of 1739-40 was colder than the winter of 1779-80.

The winter of 1804-5 exhibited so many peculiarities that it deserves a place in the history of the climate of Pennsylvania. The navigation of the Delaware was obstructed on the 18th of December. The weather partook of every disagreeable and distressing property of every cold climate on the globe. These were intense cold, deep snows, hail, sleet, high winds, and heavy rains. They generally occurred in succession, but sometimes most of them took place in the course of four and twenty hours. A serene and star-light evening, often preceded a tempestuous day. The mercury stood for many days, in Philadelphia, at 4° and 6° above 0 in Fahrenheit's ther-

* American Philosophical Transactions, vol. I.

nometer. The medium depth of the snow was two feet, but from its fall being accompanied with high winds, its height in many places was three and four feet, particularly in roads, which is rendered so impassible, as to interrupt business and social intercourse in many parts of the state. From the great depth of the snow, the ground was so much protected from the cold, that the frost extended but six inches below its surface. The newspapers daily furnished distressing accounts of persons perishing with the cold by land and water, and of shipwrecks on every part of the coast of the United States. Poultry were found dead, or with frozen feet, in their coops in many places.

This intense cold was not confined to Pennsylvania. In Norfolk, in Virginia, the mercury stood at 18° above 0 on the 22d of January. At Lexington, in Kentucky, it stood at 0 on the 21st of the same month. In Lower Canada the snow was seven feet in depth, which is three feet deeper than in common years. And such was the quantity of ice collected in the northern seas, that a ship was destroyed, and several vessels injured, by large masses of it, floating between the 41st and 42d degrees of north latitude.

Great fears were entertained of an inundation in Pennsylvania, from a sudden thaw of the immense quantities of snow and ice that had accumulated during the winter, in every part of the state; but happily they both dissolved away so gradually, as scarcely to injure a bridge or a road. On the 28th of February the Delaware was navigable, and on the 2d of March no ice was to be seen in it.

Having premised these general remarks, I proceed to observe, that there are seldom more than twenty or thirty days in summer or winter in Pennsylvania, in which the mercury rises above 80° in the former, or falls below 30° in the latter season. Some old people have remarked, that the number of *extremely* cold and warm days in successive summers and winters, bears an exact proportion to each other. This was strictly true in the years 1787 and 1788.

The warmest part of the day in summer is at two, in ordinary, and at three o'clock in the afternoon, in extremely warm weather. From these hours, the heat gradually

diminishes till the ensuing morning. The coolest part of the four and twenty hours, is at the break of day. There are seldom more than three or four nights in a summer in which the heat of the air is nearly the same as in the preceding day. After the warmest days, the evenings are generally agreeable, and often delightful. The higher the mercury rises in the day time, the lower it falls the succeeding night. The mercury at 80° generally falls to 68° , while it descends, when at 60° , but to 56° . The disproportion between the temperature of the day and night, in summer is always greatest in the month of August. The dews at this time are heavy in proportion to the coolness of the evening. They are sometimes so considerable as to wet the clothes; and there are instances in which marsh-meadows and even creeks, which have been dry during the summer, have been supplied with their usual waters from no other source, than the dews which have fallen in this month or in the first weeks of September.

There is another circumstance connected with the one just mentioned, which contributes very much to mitigate the heat of summer, and that is, it seldom continues more than two or three days without being succeeded with showers of rain, accompanied sometimes by thunder and lightning, and afterwards by a north-west wind, which produces a coolness in the air that is highly invigorating and agreeable.

The warmest weather is *generally* in the month of July. But intensely warm days are often felt in May, June, August, and September. In the annexed table of the weather for the year 1787, there is an exception to the first of these remarks. It shows that the mean heat of August was greater by a few degrees than that of July.

The transitions from heat to cold are often very sudden, and sometimes to very distant degrees. After a day in which the mercury has stood at 86° and even 90° , it sometimes falls, in the course of a single night, to the 65^{th} , and even to the 60^{th} degree, insomuch that fires have been found necessary the ensuing morning, especially if the change in the temperature of the air has been accompanied by rain and a south-east wind. In a summer month, in the year 1775, the mercury was observed to fall 20° in an

hour and a half. There are few minutes in which fires are not agreeable during some parts of them. My ingenious friend, Mr. David Rittenhouse, whose talents for accurate observation extends alike to all subjects, informed me, that he had never passed a summer, during his residence in the country, without discovering frost in every month in the year, except July.

The weather is equally variable in Pennsylvania during the greatest part of the winter. The mercury fell from 37° to $4\frac{1}{2}^{\circ}$ below 0 in four and twenty hours, between the fourth and fifth of February, 1788. In this season nature seems to play at cross purposes. Heavy falls of snow are often succeeded in a few days by a general thaw, which frequently in a short time leaves no vestige of the snow. The rivers Delaware, Schuylkill, and Susquehannah have sometimes been frozen (so as to bear horses and carriages of all kinds) and thawed so as to be passable in boats, two or three times in the course of the same winter. The ice is formed for the most part in a gradual manner, and seldom till the water has been previously chilled by a fall of snow. Sometimes its production is more sudden. On the night of the 31st of December, 1764, the Delaware was completely frozen over between ten o'clock at night and eight the next morning, so as to bear the weight of a man. An unusual vapour like a fog was seen to rise from the water, in its passage from a fluid to a solid state.

This account of the variableness of the weather in winter, does not apply to every part of Pennsylvania. There is a line about the 41° of the state, beyond which the winters are steady and regular insomuch that the earth there is seldom without a covering of snow during the three winter months. In this line the climate of Pennsylvania forms a union with the climate of the eastern and northern states.

The time in which frost and ice begin to show themselves in the neighbourhood of Philadelphia, is generally about the latter end of October or the beginning of November. But the intense cold seldom sets in till about the 20th or 25th of December, hence the common saying, "as the day lengthens, the cold strengthens." The

coldest weather is commonly in January. The navigation of the river Delaware, after being frozen, is seldom practicable for large vessels, before the first week in March.

As in summer there are often days in which fires are agreeable, so there are sometimes days in winter in which they are disagreeable. Vegetation has been observed in all the winter months. Garlic was tasted in butter in January, 1781. The leaves of the willow, the blossoms of the peach tree, and the flowers of the dandelion and the crocus, were all seen in February, 1779; and I well recollect, when a school-boy, to have seen an apple orchard in full bloom, and small apples on many of the trees, in the month of December.

A cold day in winter is often succeeded by a moderate evening. The coldest part of the four and twenty hours, is generally at the break of day.

In the most intense cold which has been recorded in Philadelphia, within the last twenty years, the mercury stood at 5° below 0. But it appears from the accounts published by Messieurs Mason and Nixon, in the 58th volume of the Transactions of the Royal Society of London, that the mercury stood at 22° below 0, on the 2nd of January, 1767, at Brandywine, about thirty miles to the westward of Philadelphia. They inform us, that on the 1st of the same month, the mercury stood at 20° , and on the day before at 7° below 0. I have to lament that I am not able to procure any record of the temperature of the air in the same year in Philadelphia. From the variety in the height and quality of the soil, and from the difference in the currents of winds and the quantity of rain and snow which fall in different parts of the state, it is very probable this excessive cold may not have extended thirty miles from that place where it was first perceived.

The greatest degree of heat upon record in Philadelphia, is 95° .

The standard temperature of the air in the city of Philadelphia is $52\frac{1}{2}^{\circ}$, which is the temperature of our deepest wells, as also the mean heat of our common spring water.

The spring in Pennsylvania is generally less pleasant

than in many other countries. In March the weather is stormy, variable, and cold. In April, and sometimes in the beginning of May, it is moist, and accompanied by a degree of cold which has been called *rawness*, and which, from its disagreeable effects upon the temper, has been called the *sirocco* of this country. From the variable nature of the weather in the spring, vegetation advances very differently in different years. The colder the spring, the more favourable it proves to the fruits of the earth. The hopes of the farmer from his fruit-trees in a warm spring are often blasted by a frost in April and May. A fall of snow is remembered with regret by many of them, on the night between the 3d and 4th of May, in the year 1774; also on the morning of the 8th of May, 1803. Such was its quantity on the latter day, that it broke down the limbs of many poplar trees. This effect was ascribed to its not being accompanied with any wind. The colder the winter, the greater delay we generally observe in the return of the ensuing spring.

Sometimes the weather during the spring months is cloudy and damp, attended occasionally with a gentle fall of rain resembling the spray from a cataract of water. A day of this kind of weather is called, from its resemblance to a damp day in Great-Britain, "an English day." This damp weather seldom continues more than three or four days. The month of May, 1786, will long be remembered, for having furnished a very uncommon instance of the absence of the sun for fourteen days, and of constant damp or rainy weather.

The month of June is the only month in the year which resembles a spring month in the southern countries of Europe. The weather is then generally temperate, the sky is serene, and the verdure of the country is universal and delightful.

The autumn is the most agreeable season in the year in Pennsylvania. The cool evenings and mornings, which generally begin about the first week in September, are succeeded by a moderate temperature of the air during the day. This kind of weather continues with an increase of cold scarcely perceptible, till the middle of October, when the autumn is closed by rain, which sometimes falls

in such quantities as to produce destructive freshets in the rivers and creeks, and sometimes descends in gentle showers, which continue with occasional interruptions by a few fair days, for two or three weeks. The rains are the harbingers of the winter; and the Indians have long ago taught the inhabitants of Pennsylvania, that the degrees of cold during the winter, are in proportion to the quantity of rain which falls during the autumn.*

From this account of the temperature of the air in Pennsylvania, it is evident that there are seldom more than four months in which the weather is agreeable without a fire.

In winter the winds generally come from the north-west in *fair*, and from the north-east in *wet* weather. The north-west winds are uncommonly dry as well as cold. It is in consequence of the violent action of these winds that trees have uniformly a thicker and more compact bark on their northern than on their southern exposures. Even brick houses are affected by the force and dryness of the north-west winds: hence it is much more difficult to demolish the northern than the southern walls of an old brick house. This fact was communicated to me by an eminent bricklayer in the city of Philadelphia.

The winds in fair weather in the spring, and in warm weather in the summer, blow from the south-west and from west-north-west. The *raw* air before-mentioned comes from the north-east. The south-west winds likewise usually bring with them those showers of rain in the spring and summer which refresh the earth. They moreover moderate the heat of the weather, provided they are succeeded by a north-west wind.

* I cannot help agreeing with Mr. Kirwan, in one of his remarks upon the science of meteorology, in the preface to his estimate of the temperature of different latitudes. "This science, (says he,) if brought to perfection, would enable us at least to foresee those changes in the weather which we could not prevent. Great as is the distance between such knowledge and our own present attainments, we have no reason to think it above the level of the power of the human mind. The motions of the planets must have appeared as perplexed and intricate to those who first contemplated them; yet, by persevering industry, they are now known to the utmost precision. The present is (as the great Leibnitz expresses it) in every case pregnant with the future; and the connexion must be found by long and attentive observation."

The influence which the perfection of this science must have upon health, agriculture, navigation, and commerce, is too obvious to be mentioned.

There is a common fact connected with the account of the usual winds in Pennsylvania, which it may not be improper to mention in this place. While the clouds are seen flying from the south west, the *scud*, as it is called, or a light vapour, is seen at the same time flying below the clouds from the north-east.

The moisture of the air is much greater than formerly, occasioned probable by the exhalations which in former years fell in the form of snow, now descending in the form of rain. The depth of the snow is sometimes between two and three feet, but in general seldom exceeds between six and nine inches.

Hail frequently descends with snow in winter. Once in four or five years large and heavy showers of hail fall in the spring and summer. They generally run in narrow veins (as they are called) of thirty or forty miles in length, and two or three miles in breadth. The heaviest shower of hail that is remembered in Philadelphia, did not extend in breadth more than half a mile north and south. Some of the stones weighed half an ounce. The windows of many houses were broken by them. The shower fell in May, 1783.

From sudden changes in the air, rain and snow often fall together, forming what is commonly called *sleet*.

In the uncultivated parts of the state, the snow sometimes lies on the ground till the first week in April. The backwardness of the spring has been ascribed to the passage of the air over the undissolved beds of snow and ice which usually remain, after the winter months are past, on the north-west grounds, and waters of the state, and of the adjacent country.

The dissolution of the ice and snow in the spring is sometimes so sudden as to swell the creeks and rivers in every part of the state to such a degree, as not only to lay waste the hopes of the husbandman from the produce of his lands, but in some instances to sweep his barns, stables, and even his dwelling house in their currents.*

* The following account of the thaw of the river Susquehannah, in the spring of 1784, was published by the author in the *Columbian Magazine*, for November, 1786. It may serve to illustrate a fact related formerly in the history of the winters in Pennsylvania, as well as to exhibit an extraordinary instance of the destructive effects of a sudden thaw.

The wind during a general thaw, comes from the south-west or south-east.

The air, when dry in Pennsylvania, has a peculiar elasticity, which renders the heat and cold less insupportable than the same degrees of both are in moister countries. It

"The winter of 1783 4 was uncommonly cold, insomuch that the mercury in Fahrenheit's thermometer stood several times at 5 degrees below 0. The snows were frequent, and, in many places, from two to three feet deep, during the greatest part of the winter. All the rivers in Pennsylvania were frozen, so as to bear wagons and sleds with immense weights. In the month of January a thaw came on suddenly, which opened our rivers so as to set the ice a-driving, to use the phrase of the country. In the course of one night, during the thaw, the wind shifted suddenly to the north-west, and the weather became intensely cold. The ice, which had floated the day before, was suddenly obstructed; and in the river Susquehannah, the obstructions were formed in those places where the water was most shallow, or where it had been accustomed to fall. This river is several hundred miles in length, and from half a mile to a mile and a half in breadth, and winds through a hilly, and in many places a fertile and highly cultivated country. It has as yet a most difficult communication with our bays and the sea, occasioned by the number and height of the falls which occur near the mouth of the river. The ice in many places, especially where there were falls, formed a kind of dam of a most stupendous height. About the middle of March our weather moderated, and a thaw became general. The effects of it were remarkable in all our rivers; but in none so much as in the river I have mentioned. I shall therefore endeavour in a few words to describe them. Unfortunately the dams of ice did not give way all at once, nor those which lay nearest to the mouth of the river, first. While the upper dams were set afloat by the warm weather, the lower ones, which were the largest, and in which, of course, the ice was most impacted, remained fixed. In consequence of this, the river rose in a few hours, in many places, above 30 feet, rolling upon its surface large lumps of ice, from 10 to 40 cubic feet in size. The effects of this sudden inundation were terrible. Whole farms were laid under water. Barns, stables, horses, cattle, fences, mills of every kind, and, in one instance, a large stone house, 40 by 30 feet, were carried down the stream. Large trees were torn up by the roots; several small islands, covered with woods, were swept away, and not a vestige of them was left behind. On the barns which preserved their shapes, in some instances, for many miles were to be seen living towns; and, in one dwelling, a candle was seen to burn for some time, after it was swept from its foundation. Where the shore was level, the lumps of ice, and the ruins of houses and farms, were thrown a quarter of a mile from the ordinary height of the river. In some instances, farms were ruined by the mould being swept from them by the cakes of ice, or by depositions of sand; while others were enriched by large depositions of mud. The damage, upon the whole, done to the state of Pennsylvania by this fresh, was very great. In most places it happened in the day time, or the consequence must have been fatal to many thousands."

"I know of but one use that can be derived from recording the history of this inundation. In case of similar obstructions of rivers from the causes such as have been described, the terrible effects of their being set in motion by means of a general thaw may in part be obviated, by removing such things out of the course of the water and ice as are within our power; particularly cattle, hay, grain, fences, and farming utensils of all kinds."

is in those cases only when summer showers are not succeeded by north-west winds, that the heat of the air becomes oppressive and distressing, from being combined with moisture.

From tradition, as well as living observation, it is evident, that the waters in many of the creeks in Pennsylvania have diminished considerably within the last fifty years. Hence many mills, erected upon large and deep streams of water, now stand idle in dry weather; and many creeks, once navigable in large boats, are now impassible even in canoes. This diminution of the waters has been ascribed to the application of a part of them to the purpose of making meadows.

The mean elevation of the barometer in Philadelphia, is about 30 inches. The variations in the barometer are very inconsiderable in the greatest changes of the weather, which occur in the city of Philadelphia. During the violent and destructive storm which blew from the south-west on the 11th of November, 1788, it suddenly fell from 30 to 29 $\frac{3}{10}$. Mr Rittenhouse informs me, that long and faithful observations have satisfied him, that the alterations in the height of the mercury in the barometer do not precede, but always succeed changes in the weather. It falls with the south and south-west, and rises with the north and north-west winds.

The quantity of water which falls in rain and snow, one year with another, amounts to from 24 to 36 inches. But to complete the account of variable qualities in the climate, it will be necessary to add, that our summers and autumns are sometimes marked by a *deficiency*, and sometimes by an *excessive* quantity of rain. The summer and autumn of 1782 were uncommonly dry. Near two months elapsed without a single shower of rain. There were only two showers in the whole months of September and October. In consequence of this dry weather, there was no second crop of hay. The Indian corn failed of its increase in many places, and was cut down for food for cattle. Trees newly planted, died. The pasture fields not only lost their verdure, but threw up small clouds of dust when agitated by the feet of men, or beasts. Cattle in some instances were driven many miles to be watered, every

morning and evening. It was remarked during this dry weather, that the sheep were uncommonly fat, and their flesh well tasted, while all the other domestic animals languished from the want of grass and water. The earth became so inflammable in some places, as to burn above a foot below its surface. A complete consumption of the turf by an accidental fire kindled in the adjoining state of New Jersey, spread terror and distress through a large tract of country. Springs of water and large creeks were dried up in many parts of the state. Rocks appeared in the river Schuylkill, which had never been observed before, by the oldest persons then alive. On one of them were cut the figures 1701. The atmosphere, during part of this dry weather, was often filled, especially in the mornings, with a thin mist, which, while it deceived with the expectation of rain, served the valuable purpose of abating the heat of the sun. A similar mist was observed in France by Dr. Franklin, in the summer of 1782. The winter which succeeded it was uncommonly cold in France, as well as in Pennsylvania. I am sorry that I am not able to furnish the mean heat of each of the summer months. My notes of the weather enable me to add nothing further upon this subject, than that the summer was "uncommonly cool."

The summer of the year 1788 afforded a remarkable instance of *excess* in the quantity of rain which sometimes falls in Pennsylvania. Thirteen days are marked with rain in July, in the records of the weather kept at Spring-Mill. There fell on the 18th and 19th of August seven inches of rain in the city of Philadelphia. The wheat suffered greatly by the constant rains of July in the eastern and middle parts of the state. So unproductive a harvest in grain, from wet weather, had not been known, it is said, in the course of the last 70 years. The heat of the air, during these summer months was very moderate. Its mean temperature at Spring Mill was 67,8 in June, 74,7 in July, and only 70,6 in August.

It is some consolation to a citizen of Pennsylvania, in recording facts which seem to militate against our climate, to reflect that the difference of the weather in different parts of the state, at the same season, is happily accom-

modated to promote an increase of the same objects of agriculture; and hence a deficiency of crops has never been known in one year throughout the *whole* state.

The aurora borealis and meteors are seen occasionally in Pennsylvania. In the present imperfect state of our knowledge of their influence upon the human body, it will be foreign to the design of this history of our climate to describe them.

Storms and hurricanes are not unknown in Pennsylvania. They occur once in four or five years, but they are most frequent and destructive in the autumn. They are generally accompanied by rain. Trees are torn up by their roots, and the rivers and creeks are sometimes swelled so suddenly as to do considerable damage to the adjoining farms. The wind, during these storms generally blows from the south-east and south west. In the storms which occurred in September, 1769, and in the same month of the year 1785, the wind veered round contrary to its usual course, and blew from the north.

After what has been said, the character of the climate of Pennsylvania may be summed up in a few words. There are no two successive years alike. Even the same successive seasons and months differ from each other every year. Perhaps there is but one steady trait in the character of our climate, and that is, it is uniformly variable.

To furnish the reader with a succinct view of the weather in Pennsylvania, that includes all the articles that have been mentioned, I shall here subjoin a table containing the result of meteorological observations made near the river Schuylkill, for one year in the neighbourhood of Philadelphia, by an ingenious French gentleman, Mr. Legeaux, who divides his time between rural employments, and useful philosophical pursuits. This table is extracted from the *Columbian Magazine*, for February, 1788. The height of Spring-Mill above the city of Philadelphia, is supposed to be about 70 feet.

It is worthy of notice, how near the mean heat of the year, and of the month of April, in two successive years, are to each other in the same place. The mean heat of April, 1787, was $54^{\circ}3$, that of April 1788, was $52^{\circ}2$. By the table of the mean heat of each month in the year, it appears that the mean heat of 1787 was 53.5, at Spring-Mill.

The following accounts of the climates of Pekin and Madrid, which lie within a few minutes of the same latitude as Philadelphia, may serve to show how much climates are altered by local and relative circumstances. The account of the temperature of the air at Pekin will serve further to show, that with all the advantages of the highest degree of cultivation which have taken place in China, the winters are colder, and the summers warmer there than in Pennsylvania, principally from a cause which will probably operate upon the winters of Pennsylvania for many centuries to come, viz. the vicinity of an uncultivated north-west country.

“PEKIN, lat. $39^{\circ} 54'$, long. $116^{\circ} 29' W$.

“By five years observations, its annual mean temperature was found to be $55^{\circ} 5'$.

January	-	$20^{\circ},75$	July	-	$84^{\circ},8$
February	-	32	August	-	83
March	-	48	September	-	63
April	-	59	October	-	52
May	-	72	November	-	41
June	-	83.75	December	-	27

“The temperature of the Atlantic under this parallel is 62, but the standard of this part of the globe is the North Pacific, which is here 4 or 5 degrees colder than the Atlantic. The Yellow Sea is the nearest to Pekin, being about 200 miles distant from it; but it is itself cooled by the mountainous country of Corea, which interposes between it and the ocean, for a considerable part of its extent. Besides, all the northern parts of China (in which Pekin lies) must be cooled by the vicinity of the mountains of Chinese Tartary among which the cold is said to be excessive.

“The greatest cold usually experienced during this period was 5° , the greatest heat 98° : on the 25th of July,

1773, the heat arose to 108° and 110° ; a N. E. or N. W. wind produces the greatest cold, a S. or S. W. or S. E. the greatest heat.”*

“MADRID, lat. $40^{\circ} 25'$, long. $3^{\circ} 20'$ E.

“The usual heat in summer is said to be from 75° to 85° ; even at night it seldom falls below 70° ; the mean height of the barometer is 27.96. It seems to be about 1900 feet above the level of the sea.”†

The above accounts are extracted from Mr. Kirwan’s useful and elaborate estimate of the temperature of different latitudes.

The history which has been given of the climate of Pennsylvania, is confined chiefly to the country on the east side of the Allegany mountain. On the west side of this mountain, the climate differs materially from that of the south-eastern parts of the state in the temperature of the air, in the effects of the winds upon the weather, and the quantity of rain and snow which falls every year. The winter seldom breaks up on the mountains before the 25th of March. A fall of snow was once perceived upon it, which measured an inch and a half on the 11th day of June. The trees which grow upon it are small, and Indian corn is with difficulty brought to maturity, even at the foot of the east side of it. The south west winds on the west side of the mountain are accompanied by cold and rain. The soil is rich, consisting of near a foot, in many places, of black mould. The roads, in this country are muddy in winter, but seldom dusty in summer. The arrangement of strata of the earth on the west side differs materially from their arrangement on the east side the mountain. “The country (says Mr. Rittenhouse, in a letter to a friend in Philadelphia,‡) when viewed from the western ridge of the Allegany, appears to be one vast extended plain. All the various strata of stone seems to lie undisturbed in the situation in which they were first formed, and the layers of stone, sand, clay, and coal, are nearly horizontal.”

The temperature of the air on the west is seldom so hot, or so cold, as on the east side of the mountain. By

* “6 Mem Scav Etrang. p. 528” † “Mem. Par. 1777, p. 146.”

‡ Columbian Magazine, for October, 1786.

comparing the state of a thermometer examined by Dr. Bedford at Pittsburgh, 284 miles from Philadelphia, it appears that the weather was not so cold by twelve degrees in that town, as it was in Philadelphia, on the 5th of February, 1788.

To show the difference between the weather at Spring-Mill and in Pittsburgh, I shall here subjoin an account of it in both places, the first taken by Mr. Legeaux, and the other by doctor Bedford.

From a review of all the facts which have been mentioned, it appears that the climate of Pennsylvania is a compound of most of the climates in the world. Here we have the moisture of Britain in the spring, the heat of Africa in summer, the temperature of Italy in June, the sky of Egypt in the autumn, the cold and snows of Norway and the ice of Holland in the winter, the tempests in a certain degree of the West-Indies in every season, and the variable winds and weather of Great Britain in every month of the year.

From this history of the climate of Pennsylvania, it is easy to ascertain what degrees of health, and what diseases prevail in the state. As we have the climates, so we have the health, and the acute diseases of all the countries that have been mentioned. Without attempting to enumerate the diseases, I shall only add a few words upon the time and manner in which they are produced.

I. It appears from the testimonies of many aged persons, that pleurises and inflammatory diseases of all kinds are less frequent now than they were forty or fifty years ago.

II. It is a well known fact, that intermitting and billious fevers have increased in Pennsylvania in proportion as the country has been cleared of its wood, in many parts of the state.

III. It is equally certain that these fevers have lessened or disappeared, in proportion as the country has been cultivated.

IV. Heavy rains and freshes in the spring seldom produce fevers, unless they are succeeded by unseasonably warm weather.

V. Sudden changes from great heat to cold, or cool weather, if they occur before the 20th of August, seldom produce fevers. After that time, they are generally followed by them.

VI. The same state of the atmosphere, whether cold or warm, moist or dry, continued for a long time, without any material changes, is always healthy. Acute and inflammatory fevers were in vain looked for in the cold winter of 1779-80. The dry summer of 1782, and the wet summer of 1788, were likewise uncommonly healthy

in the city of Philadelphia. These facts extend only to those diseases which depend upon the sensible qualities of the air, for diseases from miasmata and contagion, are less influenced by the uniformity of the weather. The autumn of 1780 was very sickly in Philadelphia, from the peculiar situation of the grounds in the neighbourhood of the city, while the country was uncommonly healthy. The dry summer and autumn of 1782 were uncommonly sickly in the country, from the extensive sources of morbid exhalations which were left by the diminution of the waters in the creeks and rivers.

VII. Diseases are often generated in one season and produced in another. Hence we frequently observe fevers of different kinds to follow every species of the weather that was mentioned in the last observation.

VIII. The excessive heat in Pennsylvania has sometimes proved fatal to persons who have been much exposed to it. Its morbid effects discover themselves by a difficulty of breathing, a general languor, and, in some instances, by a numbness and immobility of the extremities. The excessive cold in Pennsylvania has more frequently proved fatal, but it has been chiefly to those persons who have sought a defence from it, by large draughts of spirituous liquors. Its operation in bringing on sleepiness previous to death, is well known. On the 5th of February, 1788, many people were affected by the cold. It produced a violent pain in the head; and, in one instance, a sickness at the stomach, and a vomiting appeared to be the consequence of it. I have frequently observed that a greater number of old people die, during the continuance of extreme cold and warm weather, than in the same number of days in moderate weather.

IX. May and June are usually the healthiest months in the year.

X. The influence of the winds upon health, depends very much upon the nature of the country over which they pass. Winds which pass over mill-dams and marshes in August and September, generally carry with them the seeds of fevers.

XI. The country in the neighbourhood of Philadelphia was formerly more sickly than the central parts of the

city, after the 20th of August. Since the year 1793, the reverse of this has been the case.

XII. The night air is always unwholesome from the 20th of August, especially during the passive state of the system in sleep. The frequent and sudden changes of the air from heat to cold render it unsafe to sleep with open windows, during the autumnal months.

XIII. Valetudinarians always enjoy the most health in Pennsylvania in the summer and winter months. The spring, in a particular manner, is very unfavourable to them.

I shall conclude the account of the influence of the climate of Pennsylvania upon the human body, with the following observations.

1. The sensations of heat and cold are influenced so much by outward circumstances, that we often mistake the degrees of them by neglecting to use such conveniences as are calculated to obviate the effects of their excess. A native of Jamaica often complains less of the heat, and a native of Canada of the cold in their respective countries, than they do under certain circumstances in Pennsylvania. Even a Pennsylvanian frequently complains less of the heat in Jamaica, and of the cold in Canada, than in his native state. The reason of this is plain. In countries where heat and cold are intense and regular, the inhabitants guard themselves, by accommodating their houses and dresses to each of them. The instability and short duration of excessive heat and cold in Pennsylvania, have unfortunately led its inhabitants in many instances, to neglect adopting customs, which are used in hot and cold countries to guard against them. Where houses are built with a southern or a south-western front exposure, and where other accommodations to the climate are observed in their construction, the disagreeable excesses of heat and cold are rendered much less perceptible in Pennsylvania. Perhaps the application of the principles of philosophy and taste to the construction of our houses, within the last thirty or forty years, may be another reason why some old people have supposed that the degrees of heat and cold are less in Pennsylvania than they were in former years.

2. The variable nature of the climate of Pennsylvania

does not render it necessarily unhealthy. Doctor Huxham has taught us, that the healthiest seasons in Great-Britain have often been accompanied by the most variable weather. His words upon this subject convey a reason for the fact. "When the constitutions of the year are frequently changing, so that by the contrast a sort of equilibrium is kept up, and health with it; and that especially if persons are careful to guard themselves well against these sudden changes."* Perhaps no climate or country is unhealthy, where men acquire from experience, or tradition, the arts of accommodating themselves to it. The history of all the nations of the world, whether savage, barbarous, or civilized, previously to a mixture of their manners, by an intercourse with strangers, seems to favour this opinion. The climate of China appears, in many particulars to resemble that of Pennsylvania. The Chinese wear loose garments of different lengths, and increase or diminish the number of them, according to the frequent and sudden changes of their weather; hence they have very few acute diseases among them. Those inhabitants of Pennsylvania who have acquired the arts of conforming to the changes and extremes of our weather in dress, diet, and manners, escape most of those acute diseases which are occasioned by the sensible qualities of the air; and faithful inquiries and observations have proved, that they attain to as great ages as the same number of people in any part of the world.

* Observations on the Air and Epidemic Diseases, vol. i. p. 5.

AN ACCOUNT
OF THE
EFFICACY OF COMMON SALT,
IN THE
CURE OF HÆMOPTYSIS.

AN ACCOUNT, &c.

FROM the present established opinions and practice respecting the cause and cure of hæmoptysis, the last medicine that would occur to a regular-bred physician for the cure of it, is COMMON SALT; and yet I have seen and heard of a great number of cases, in which it has been administered with success.

The mode of giving it is to pour down from a tea to a table-spoonful of clean fine salt, as soon as possible after the hæmorrhage begins from the lungs. This quantity generally stops it; but the dose must be repeated daily for three or four days to prevent a return of the disease. If the bleeding continue, the salt must be continued till it is checked, but in larger doses. I have heard of several instances in which two table spoons-full were taken at one time for several days.

It sometimes excites a sickness at the stomach, and never fails to produce a burning sensation in the throat, in its passage into the stomach, and considerable thirst afterwards.

I have found this remedy to succeed equally well in hæmorrhages, whether they occurred in young or in old people, or with a weak or active pulse.

I had prescribed it for several years before I could satisfy myself with a theory, to account for its extraordinary action upon the human body. My inquiries led me to attend more particularly to the following facts:

1. Those persons who have been early instructed in vocal music, and who use their vocal organs moderately through life, are seldom affected by a hæmorrhagè from the lungs.

2. Lawyers, players, public cryers, and city watchmen, all of whom exercise their lungs either by long or loud speaking, are less affected by this disease, than persons of other occupations.

I acknowledge I cannot extend this observation to the public teachers of religion. I have known several instances of their being affected by hæmoptysis; but never but one in which the disease came on in the pulpit, and that was in a person who had been recently cured of it. The cases which I have seen, have generally been brought on by catarrhs.

To this disease, the practice of some of our American preachers disposes them in a peculiar manner; for it is very common with this class of them, to expose themselves to the cold or evening air, immediately after taking what a celebrated and eloquent preacher used to call a pulpit sweat.

3. This hæmorrhage chiefly occurs in debilitated habits, or in persons afflicted by such a predisposition to consumption, as indicates a weak and relaxed state of the lungs.

4. It generally occurs when the lungs are in a passive state; as in sitting, walking, and more frequently in lying. Many of the cases that I have known, have occurred during sleep, in the middle of the night.

From these facts, is it not probable that the common salt, by acting primarily, and with great force upon the throat, extends its stimulus to the bleeding vessel, and by giving it a tone, checks the further effusion of blood?

I shall only add to this conjecture, the following observations:

1. I have never known the common salt perform a cure where the hæmorrhages from the lungs has been a symptom of a confirmed consumption. In this case, however, it gives a certain temporary relief. But the bleeding, so unfavourable in the close of this disease, often prevents consumption when it occurs in its early stage, by depleting entirely from the lungs.

2 The exhibition of common salt in the hæmoptysis, should by no means supersede the use of occasional bleeding when indicated by plethora, nor of that diet which the state of the pulse or of the stomach, may require.

3. I have given the common salt in one case with success, in a hæmorrhage from the stomach, accompanied by a vomiting; and have heard of several cases in which it has been supposed to have checked a discharge of blood

from the nose and uterus, but I can say nothing further in its favour in these last hæmorrhages, from my own experience.

It may perhaps serve to lessen the prejudices of physicians against adopting improvements in medicine, that are not recommended by the authority of colleges or universities, to add, that we are indebted to an old woman, for the discovery of the efficacy of common salt in the cure of hæmoptysis.

THOUGHTS
UPON
THE CAUSE AND CURE
OF THE
PULMONARY CONSUMPTION.

THOUGHTS, &c.

THE ancient Jews used to say, that a man does not fulfil his duties in life who passes through it, without building a house, planting a tree, and leaving a child behind him. A physician in like manner, should consider his obligations to his profession and society as undischarged, who has not attempted to lessen the number of incurable diseases. This is my apology for presuming to make the consumption the object of a medical inquiry.

Perhaps I may suggest an idea, or fact, that may awaken the ideas and facts which now lie useless in the memories or common-place books of other physicians; or I may direct their attention to some useful experiments upon this subject.

I shall begin my observations upon the consumption, by remarking,

1. That it is unknown among the Indians in North-America.

2. It is scarcely known by those citizens of the United States, who live in the first stage of civilized life, and who have lately obtained the title of the first settlers.

The principal occupations of the Indians consist in war, fishing and hunting. Those of the first settlers, are fishing, and hunting, and the laborious employments of subduing the earth, cutting down forests, building a house and barn, and distant excursions in all kinds of weather, to mills and courts, all which tend to excite and preserve in the system, something like the Indian vigour of constitution.

3. It is less common in country places than in cities, and increases in both, with intemperance and sedentary modes of life.

4. Ship and house carpenters, smiths, and all those artificers whose business requires great exertions of strength in the open air, in all seasons of the year, are less subject

to this disease than men who work under cover, and at occupations which do not require the constant action of their limbs.

5. Women who sit more than men, and whose work is connected with less exertion, are most subject to the consumption.

From these facts it would seem, that the most probable method of curing the consumption, is to revive in the constitution, by means of exercise or labour, that vigour which belongs to the Indians, or to mankind in their first stage of civilization.

The efficacy of these means of curing consumption will appear, when we inquire into the relative merit of the several remedies which have been used by physicians in this disease.

I shall not produce among these remedies the numerous receipts for syrups, boluses, electuaries, decoctions, infusions, pills, medicated waters, powders, draughts, mixtures, and diet-drinks, which have so long and so steadily been used in this disease; nor shall I mention as a remedy, the best accommodated diet, submitted to with the most patient self denial; for not one of them all without the aid of exercise, has ever, I believe, cured a single consumption.

1. SEA-VOYAGES have cured consumptions; but it has been only when they have been so long; or so frequent, as to substitute the long continuance of gentle, to violent degrees of exercise of a shorter duration, or where they have been accompanied by some degree of labour and care of navigating the ship.

2. A CHANGE of CLIMATE has often been prescribed for the cure of consumptions, but I do not recollect an instance of its having succeeded, except when it has been accompanied by exercise, as in travelling, or by some active laborious pursuit.

Doctor Gordon of Madeira, ascribes the inefficacy of the air of Madeira in the consumption, in part to the difficulty patients find of using exercise in carriages, or even on horseback, from the badness of the roads in that island.

3. JOURNEYS have often performed cures in the consumption, but it has been chiefly when they have been

long, and accompanied by difficulties which have roused and invigorated the powers of the mind and body.

4. **VOMITS** and **NAUSEATING MEDICINES** have been much celebrated for the cure of consumptions. These, by procuring a temporary determination to the surface of the body, so far lessen the pain and cough, as to enable patients to use profitable exercise. Where this has not accompanied or succeeded the exhibition of vomits, I believe they have seldom afforded any permanent relief.

5. **BLOOD-LETTING** has often relieved consumptions; but it has been only by removing the troublesome symptoms of inflammatory diathesis, and thereby enabling the patients to use exercise, or labour, with advantage.

6. **VEGETABLE BITTERS** and some of the **STIMULATING GUMS** have in some instances afforded relief in consumptions; but they have done so only in those cases where there was great debility, accompanied by a total absence of inflammatory diathesis. They have most probably acted by their tonic qualities, as substitutes for labour and exercise.

7. A **PLENTIFUL** and **REGULAR PERSPIRATION**, excited by means of a flannel shirt, worn next to the skin, or by means of a stove room, or by a warm climate, has in many instances prolonged life in consumptive habits; but all these remedies have acted as palliatives only, and thereby have enabled the consumptive patients to enjoy the more beneficial effects of exercise.

8. **BLISTERS**, **SETONS** and **ISSUES**, by determining the perspirable matter from the lungs to the surface of the body, lessen pain and cough, and thereby prepare the system for the more salutary effects of exercise.

9. The effects of **SWINGING** upon the pulse and respiration, leave us no room to doubt of its being a tonic remedy, and therefore a safe and agreeable substitute for exercise.

From all these facts it is evident, that the remedies for consumption must be sought for in those *exercises and employments which give the greatest vigour to the constitution*. And here I am happy in being able to produce several facts which demonstrate the safety and certainty of this method of cure.

During the late war, I saw three instances of persons in confirmed consumptions, who were perfectly cured by the hardships of a military life. They had been my patients previously to their entering into the army. Besides these, I have heard of four well-attested cases of similar recoveries from nearly the same remedies. One of these was the son of a farmer in New Jersey, who was sent to sea as the last resource for a consumption. Soon after he left the American shore, he was taken by a British cruiser, and compelled to share in all the duties and hardships of a common sailor. After serving in this capacity for twenty-two months, he made his escape, and landed at Boston, from whence he travelled on foot to his father's house (nearly four hundred miles,) where he arrived in perfect health.

Doctor Way of Wilmington informed me, that a certain Abner Cloud, who was reduced so low by a pulmonary consumption as to be beyond all relief from medicine, was so much relieved by sleeping in the open air, and by the usual toils of building a hut, and improving a farm, in the unsettled parts of a new country in Pennsylvania, that he thought him in a fair way of perfect recovery.

Doctor Latimer of Wilmington had been long afflicted with a cough and an occasional hæmoptysis. He entered into the American army as a surgeon, and served in that capacity till near the end of the war; during which time he was perfectly free from all pulmonary disease. The spitting of blood returned soon after he settled in private practice. To remedy this complaint, he had recourse to a low diet, but finding it ineffectual, he partook liberally of the usual diet of healthy men, and he now enjoys a perfect exemption from it.

It would be very easy to add many other cases, in which labour, the employments of agriculture, and a life of hardship by sea and land, have prevented, relieved, or cured, not only the consumption, but pulmonary diseases of all kinds.

To the cases that have been mentioned, I shall add only one more, which was communicated to me by the venerable Doctor Franklin, whose conversation at all times con-

veyed instructions, and not less in medicine than upon other subjects. In travelling, many years ago, through New England, the Doctor overtook the post-rider; and after some inquiries into the history of his life, he informed him that he was bred a shoemaker; that his confinement, and other circumstances, had brought on a consumption, for which he was ordered by a physician to ride on horseback. Finding this mode of exercise too expensive, he made interest, upon the death of an old post-rider, to succeed to his appointment, in which he perfectly recovered his health in two years. After this he returned to his old trade, upon which his consumption returned. He again mounted his horse, and rode post in all seasons and weathers, between New York and Connecticut river (about 140 miles,) in which employment he continued upwards of thirty years, in perfect health.

These facts, I hope, are sufficient to establish the advantages of restoring the original vigour of the constitution, in every attempt to effect a radical cure of consumption.

But how shall these remedies be applied in the time of peace, or in a country where the want of woods, and brooks without bridges, forbid the attainment of the laborious pleasures of the Indian mode of hunting; or where the universal extent of civilization does not admit of our advising the toils of a new settlement, and improvements upon bare creation? Under these circumstances, I conceive substitutes may be obtained for each of them, nearly of equal efficacy, and attainable with much less trouble.

1. Doctor Sydenham pronounced riding on horseback, to be as certain a cure for consumptions as bark is for an intermitting fever. I have no more doubt of the truth of this assertion, than I have that inflammatory fevers are now less frequent in London than they were in the time of Doctor Sydenham. If riding on horseback in consumptions has ceased to be a remedy in Britain, the fault is in the patient, and not in the remedy "It is a sign that the stomach requires milk (says Doctor Cadogan,) when it cannot bear it." In like manner, the inability of the patient to bear this manly and wholesome exercise,

serves only to demonstrate the necessity and advantages of it. I suspect the same objections to this exercise which have been made in Britain, will not occur in the United States of America; for the Americans, with respect to the symptoms and degrees of epidemic and chronic diseases, appear to be nearly in the same state that the inhabitants of England were in the seventeenth century. We find, in proportion to the decline of the vigour of the body, that many occasional causes produce fever and inflammation, which would not have done it a hundred years ago.

2. The laborious employments of agriculture, if steadily pursued, and accompanied at the same time by the simple, but wholesome diet of a farm-house, and a hard bed, would probably afford a good substitute for the toils of a savage or military life.

3. Such occupations or professions as require constant labour or exercise in the open air in all kinds of weather, may be easily chosen for a young man, who, either from hereditary predisposition, or an accidental affection of the lungs, is in danger of falling into a consumption. In this we should imitate the advice given by some wise men, always to prefer those professions for our sons, which are the least favourable to the corrupt inclinations of their hearts. For example, where an undue passion for money, or a crafty disposition, discover themselves in early life, we are directed to oppose them by the less profitable or more disinterested professions of divinity or physic, rather than cherish them by trade, or the practice of the law. Agreeably to this analogy weakly children should be trained to the laborious, and the robust, to the sedentary occupations. From a neglect of this practice, many hundred apprentices to taylor, shoemakers, conveyancers, watchmakers, silver-smiths, and mantua-makers, perish every year by consumption.

4. There is a case recorded by Doctor Smollet, of the efficacy of the cold bath in a consumption; and I have heard of its having been used with success in the case of a negro man in one of the West-India islands. To render this remedy useful, or even safe, it will be necessary to join it with labour, or to use it in degrees that shall

prevent the alteration of the system with vigour and debility ; for I take the cure of consumption ultimately to depend upon the simple and constant action of tonic remedies. It is to be lamented that it often requires so much time, or such remedies to remove the inflammatory diathesis, which attends the first stage of consumption, as to reduce the patient too low to make use of those tonic remedies afterwards, which would effect a radical cure.

If it were possible to graduate the tone of the system by means of a scale, I would add, that to cure consumption, the system should be raised to the highest degree of this scale. Nothing short of an equilibrium of tone, or free and vigorous action of every muscle and viscus in the body, will fully come up to a radical cure of this disease.

In regulating the diet of consumptive patients, I conceive it to be as necessary to feel the pulse, as it is in determining when and in what quantity to draw blood. Where inflammatory diathesis prevails, a vegetable diet is certainly proper ; but where the patient has escaped, or passed this stage of the disease, I believe a vegetable diet alone to be injurious ; and am sure a moderate quantity of animal food may be taken with advantage.

The presence or absence of this inflammatory diathesis, furnishes the indications for administering or refraining from the use of the bark and balsamic medicines. With all the testimonies of their having done mischief, many of which I could produce, I have known several cases in which they have been given with obvious advantage ; but it was only when there was a total absence of inflammatory diathesis.

Perhaps the remedies I have recommended, and the opinions I have delivered, may derive some support from attending to the analogy of ulcers on the legs, and in other parts of the body. The first of these occur chiefly in habits debilitated by spirituous liquors, and the last frequently in habits debilitated by the scrophula. In curing these diseases, it is in vain to depend upon internal or external medicines. The whole system must be strength-

ened, or we do nothing; and this is to be effected only by exercise and a generous diet.

In relating the facts that are contained in this inquiry, I wish I could have avoided reasoning upon them; especially as I am confident of the certainty of the facts, and somewhat doubtful of the truth of my reasonings.

I shall only add, that if the cure of consumptions should at last be effected by remedies in every respect the opposites of those palliatives which are now fashionable and universal, no more will happen than what we have already seen in the tetanus, the small-pox, and the management of fractured limbs.

Should this be the case, we shall not be surprised to hear of physicians, instead of prescribing any one, or all of the medicines formerly enumerated for consumptions, ordering their patients to exchange the amusements, of indolence of a city, for the toils of a country life; of their advising farmers to exchange their plentiful tables, and comfortable fire-sides, for the scanty but solid subsistence, and midnight exposures of the herdsmen; or of their recommending, not so much the exercise of a passive sea voyage, as the active labours and dangers of a common sailor. Nor should it surprise us, after what we have seen, to hear patients relate the pleasant adventures of their excursions or labours, in quest of their recovery from this disease, any more than it does now to see a strong or well-shaped limb that has been broken; or to hear a man talk of his studies, or pleasures, during the time of his being inoculated and attended for the small-pox.

I will not venture to assert, that there does not exist a medicine which shall supply, at least in some degree, the place of the labour or exercises, whose usefulness in consumptions has been established by the facts that have been mentioned. Many instances of the analogous effects of medicines, and of exercise upon the human body, forbid the supposition. If there does exist in nature such a medicine, I am disposed to believe it will be found in the class of **TONICS**. If this should be the case, I conceive its strength, or its dose, must far exceed the present state of our knowledge or practice, with respect to the efficacy or dose of tonic medicines.

I except the disease, which arises from recent abscesses in the lungs from the general observation which has been made, respecting the inefficacy of the remedies that were formerly enumerated for the cure of consumptions without labour or exercise. These abscesses often occur without being preceded by general debility, or accompanied by a consumptive diathesis, and are frequently cured by nature, or by very simple medicines.

AN INQUIRY
INTO
THE CAUSE AND CURE
OF THE
PULMONARY CONSUMPTION.

AN INQUIRY, &c.

In the preceding Inquiry, I attempted to show that this disease was the effect of causes which induce general debility, and that the only hope of discovering a cure for it should be directed to such remedies as act upon the whole system. In the following inquiry, I shall endeavour to establish the truth of each of those opinions, by a detail of facts and reasonings, at which I only hinted in the foregoing pages.

The method I have chosen for this purpose, is to deliver and afterwards to support a few general propositions.

I shall begin by remarking,—

I. That the pulmonary consumption is induced by pre-disposing dibility.

This I infer, 1st, From the remote and exciting causes which produce it. The remote causes are pneumony, catarrh, hæmoptysis, rheumatism, gout asthma, scorphula, chronic diseases of the stomach, liver, and kidneys, nervous and intermitting fevers, measles, repelled humours from the surface of the body, the venereal disease, obstructed menses, sudden growth about the age of puberty, grief, and all other debilitating passions of the mind; hypochondriasis, improper lactation, excessive evacuation of all kinds more especially by stool*, cold and damp air, a cough, external violence acting upon the body;† and finally, every thing that tends, directly or indirectly to diminish the strength of the system.

* Sir George Baker relates, in the second volume of the Medical Transactions, that Dr. Blanchard had informed him, that he had seen the consumption brought on ten persons out of ninty, by excessive purging used to prepare the body for the small-pox. I have seen a case of consumption in a youth of 17, from the spitting produced by the intemperate use of segars.

† Dr Lind says, that out of 360 patients whom he attended between July 1st 1758, and July 1st, 1760, in consumptions the disease was brought on *one fourth* of them by falls, bruises, and strains, received a year or two before the disease made its appearance.

The most frequent exciting cause of consumption is the alternate application of heat and cold to the whole external surface of the body; but all the remote causes which have been enumerated, operate as exciting causes of consumption, when they act on previous debility. Original injuries of the lungs seldom excite this disease, except they first induce a debility of the whole system, by a troublesome and obstinate cough.

2. From the debilitating occupations and habits of persons who are liable to this disease. These are studious men, and mechanics who lead sedentary lives in confined places; also women and all persons of irritable habits, whether of body or mind.

3. From the period in which persons are most liable to be affected by this disease. This is generally between the 18th and 36th years of life, a period in which the system is liable, in a peculiar manner, to most diseases which induce it, and in which there is a greater expenditure of strength, than in any other stage of life, by the excessive exercises of the body and mind, in the pursuits of business or pleasure.

I have conformed to authors, in fixing the period of consumptions between the 18th and 36th years of life; but it is well known that it sometimes appears in children, and frequently in persons beyond the 40th, or even 60th year of life.

II. The pulmonary consumption is a primary disease of the whole system. This I infer—

1. From the causes which produce it, acting upon the whole system.

2. From the symptoms of general debility which always precede the affection of the lungs. These symptoms are a quick pulse, especially towards evening; a heat and burning in the palms of the hands; faintness, head-ach, sickness at stomach, and an occasional diarrhæa. I have frequently observed each of these symptoms for several months before I have heard of a single complaint in the breast.

3. From the pulmonary consumption alternating with other diseases which obviously belong to the whole system. I shall briefly mention these diseases.

The RHEUMATISM. I have seen many cases in which this disease and the consumption have alternated, in different seasons or years, affected the system. In the winter of 1792, three clinical patients in the Pennsylvania hospital exemplified by their complaints the truth of this observation. They were relieved several times of a cough by rheumatic pains in their limbs, which seemed for a while to promise a cure to their pulmonic complaints.

The GOUT has often been observed to alternate with the pulmonary consumption, especially in persons in the decline of life. Dr. Sydenham describes a short cough continuing through the whole winter, as a symptom of gouty habits. A gentleman from Virginia died under my care in the spring of 1788, in the 45th year of his age, with all the symptoms of pulmonary consumption, which had frequently alternated with pains and a swelling in his feet.

The pulmonary consumption has been observed to alternate with **MADNESS**. Of this I have seen two instances, in both of which the cough and expectoration were wholly suspended during the continuance of the derangement of the mind. Dr. Mead mentions a melancholy case of the same kind in a young lady, and similar cases are to be met with in other authors. In all of them the disease proved fatal. In one of the cases which came under my notice, the symptoms of consumption returned before the death of the patient.

I have likewise witnessed two cases in which the return of reason after madness, was suddenly succeeded by a fatal pulmonary consumption. Perhaps the false hopes, and even the cheerfulness which so universally occur in this disease, may be resolved into a morbid state of the mind produced by a general derangement of the whole system. So universal are the delusions and hopes of patients, with respect to the nature and issue of this disease, that I have never met with but one man, who, upon being asked what was the matter with him, answer unequivocally, "that he was in a consumption,"

Again: Dr. Bennet mentions a case of "A phthisical patient, who was seized with a violent **PAIN IN THE TEETH** for two days, and in whom, during that time,

“every symptom of a consumption, except the leanness of the body, altogether vanished:” and he adds further, “that a defluction on the lungs had often been relieved by SALIVARY EVACUATIONS.”*

I have seen several instances in which the pulmonary symptoms have alternated with HEADACH and DYSPEPSIA; also with pain and noise in one EAR. This affection of the ears sometimes continues throughout the whole disease, without any remission of the pulmonary symptoms. I have seen one case of a discharge of matter from the left ear without being accompanied by either pain or noise.

In all our books of medicine are to be found cases of consumption alternating with ERUPTIONS ON THE SKIN.

And who have not seen the pulmonary symptoms alternately relieved and produced by the appearance or cessation of diarrhæa, or pains in the BOWELS?

To these facts I shall only add, under this head, as a proof of the consumption being a disease of the whole system that it is always more or less relieved by the change which is induced in the system by pregnancy.

4. I infer that the pulmonary consumption is a disease of the whole system from an analogy with several other diseases, which though accompanied by local affections are obviously produced by a morbid state of the whole system.

The rheumatism, the gout the measles, small-pox, the different species of the cynanche, all furnish examples of the connexion of local affections with a general disease; but the APOPLEXY, and the PNEUMONY, furnish the most striking analogies of local affection, succeeding a general disease of the system in the pulmonary consumption.

The most frequent predisposing cause of apoplexy is a general debility of the system, produced by intemperance in eating and drinking. The phenomena of the disease are produced by an effusion of blood or serum, in consequence of a morbid distention or of a rupture of the vessels of the brain. The pulmonary consumption begins and ends in the same way, allowing only for the difference of situation and structure of the brain and lungs. After

* Treatise of the Nature and Cure of Consumptions. Exercitation X.

the production of predisposing debility from the action of the remote causes formerly enumerated, the fluids are determined to the weakest part of the body. Hence effusions of serum or blood take place in lungs. When serum is effused, a pituitous or purulent expectoration alone takes place; when blood is discharged, a disease is produced which has been called hæmoptysis. An effusion of blood in the brain, brought on by the operation of general debility, has been called by Dr. Hoffman, with equal propriety, hæmorrhge of the brain. The effusion of blood in the lungs, in consequence of the rupture of a blood-vessel, is less fatal than the same accident when it occurs in the brain, only because the blood in the former case is more easily discharged from the system. Where no rupture of a blood-vessel is produced, death is nearly as speedy and certain in one case as in the other. Dissections show many cases of suffocation and death, from the lungs being preternaturally filled with blood or serum. From this great analogy between the remote and proximate causes of the two diseases which have been described I have taken the liberty to call them both by the name of apoplexy. The only symptom which does not accord with the derivation of the term, is, that in the apoplexy of the lungs, the patient does not fall down as if by an external stroke, which is most frequently the case in the apoplexy of the brain.

The history of the remote and proximate causes of pneumony will furnish us with a still more remarkable analogy of the connection between a local affection, and a general disease of the system. The pneumony is produced by remote exciting causes which act on the whole system. The arterial system is frequently agitated by a fever in this disease before a pain is perceived in the breast or sides and this fever generally constitutes its strength and danger. The expectoration which terminates the disease in health, is always the effects of effusions produced by a general disease and even the vomicas, which sometimes succeed a deficiency of bleeding always depend upon the same general cause. From this view of the analogy between pneumony and pulmonary consumption, it would seem that the two diseases differed from each other only

by the shorter or longer operation of the causes which induce them, and by the greater or less violence and duration of their symptoms. The pneumony appears to be an acute consumption, and the consumption a chronic pneumony. From the analogy of the pulmonary consumption with the diminutive term of certain fevers, I have taken the liberty of calling it a *PNEUMONICULA*.

5. I infer that the pulmonary consumption is a disease of the whole system, from its existence without ulcers in the lungs. Of this there are many cases recorded in books of medicine.

Dr. Leigh informs us, in his *Natural History of Lancashire*, that the consumption was a very common disease on the sea coast of that country; but that it was not accompanied either by previous inflammation or ulcers in the lungs. It was generally attended, he says, by an unusual pcevishness of temper.

6. I infer that the pulmonary consumption is a disease of the whole system, from its being relieved or cured, only by remedies which act upon the whole system. This will appear, I hope, hereafter, when we come to treat of the cure of this disease.

Let us now inquire how far the principle I have laid down will apply to the supposed causes of consumption, These causes have been said to be an abscess in the lungs, hæmoptysis, tubercles, without and with ulcers, catarrh, hereditary diathesis, contagion, and the matter of cutaneous eruptions, or sores repelled, and thrown upon the lungs. I shall make a few observations upon each of them.

1. An abscess in the lungs is generally the consequence of a neglected, or half-cured pneumony. It is seldom fatal, where it is not connected with a predisposition to consumption from general debility, or where general debility is not previously induced by the want of appetite, sleep, and exercise, which sometimes accompany that disease of the lungs. This explanation of the production of consumption by an abscess in the lungs, will receive further support from attending to the effects of wounds in the lungs. How seldom are they followed by pulmonary consumption; and this only because they are as seldom ac-

accompanied by predisposed general debility. I do not recollect a single instance of this disease having followed a wound in the lungs, either by the bayonet or a bullet, during our revolutionary war. The recoveries which have succeeded such wounds, and frequently under the most unfavourable circumstances, show how very improbable it is that a much slighter affection of the lungs should become the cause of the pulmonary consumption.

A British officer whom I met in the British camp, a few days after the battle of Brandywine, in September, 1777, informed me that the surgeon-general of the royal army had assured him, that out of twenty-four soldiers who had been admitted into the hospitals, during the campaign of 1776, with wounds in their lungs, twenty-three of them had recovered. Even primary diseases of the lungs often exist with peculiar violence, or continue for many years without inducing a consumption. I have never known but one instance of the whooping cough ending in consumption, and all our books of medicine contain records of the asthma continuing for twenty and thirty years without terminating in that disease. The reason in both cases, must be ascribed to those two original diseases of the lungs not being accompanied by general debility. One fact more will serve to throw still further light upon the subject. Millers are much afflicted with a cough from floating particles of flour constantly irritating their lungs, and yet they are more subject to consumptions than other labouring people. Hence "a miller's cough" is proverbial in some places to denote a cough of long continuance without danger.

2. The hæmoptysis is either a local disease or it is the effect of general debility of the whole system. When it is local, or when it is the effect of causes which induce a temporary or acute debility only in the system, it is seldom followed by consumption. The accidental discharge of blood from the lungs, from injuries, and from an obstruction of the menses in women is of this kind. Many persons are affected by this species of hæmorrhage once or twice in their lives, without suffering any inconvenience from it afterwards. I have met with several cases in which it has occurred for many years every time the body was

exposed to any of the causes which induce sudden debility, and yet no consumption has followed it. The late king of Prussia informed Dr. Zimmerman that he had been frequently attacked by it during his seven years war, and yet he lived, notwithstanding above twenty years afterwards without any pulmonary complaints. It is only in persons who labour under chronic debility, that hæmoptysis is necessarily followed by consumption.

3. I yield to the popular mode of expression when I speak of the consumption being produced by tubercles. But I maintain that they are the effects of a general debility communicated to the bronchial vessels which cause them to secrete a preternatural quantity of mucus. This mucus is sometimes poured into the trachea from whence it is discharged by hawking more especially in the morning; for it is secreted more copiously during the languid hours of sleep than in the day time. But this mucus is frequently secreted into the substance of the lungs, where it produces those tumors we call tubercles. When this occurs there is either no cough* or a very dry one. That tubercles are formed in this way, I infer from the dissections and experiments of Dr. Stark†, who tells us, that he found them to consist of inorganic matter; that he was unable to discover any connection between them and the pulmonary vessels; by means of the microscope or injections; and that they first opened into the trachea through the bronchial vessels. It is remarkable that the colour and consistence of the matter of which they are composed, is nearly the same as the matter which is discharged through the trachea, in the moist cough which occurs from the relaxation of the bronchial vessels, and which has been called by Dr. Beddoes a bronchial gleet.

I am aware that these tumours in the lungs have been ascribed to scrophula. But the frequent occurrence of consumptions in persons in whom no scrophulous taint existed, is sufficient to refute this opinion. I have frequently directed my inquiries after this disease in consumptive patients, and have met with very few cases

* See Med. Com. Vol. II.

† Clinical and Anatomical Observations, p. 26, 27. See also Morgagni, letter xxii, 21.

which were produced by it. It is probable that it may frequently be a predisposing cause of consumption in Great Britain, but I am sure it is not in the United States. Baron Humboldt informed me, that the scrophula is unknown in Mexico, and yet consumptions, he said, are very common in that part of Spanish America. That tubercles are the effects, and not the cause of pulmonary consumption, is further evident from similar tumours being suddenly formed on the intestines by the dysentery, and on the omentum by a yellow fever. Cases of the former are to be met with in the dissections of Sir John Pringle, and one of the latter is mentioned by Dr. Mackittrick, in his inaugural dissertation upon the yellow fever, published in Edinburgh in the year 1766.*

4. The catarrh is of two kinds, acute and chronic, both of which are connected with general debility, but this debility is most obvious in the chronic catarrh: hence we find it increased by every thing which acts upon the whole system, such as cold and damp weather, fatigue, and, above all, by old age, and relieved or cured by exercise, and every thing else which invigorates the whole system. This species of catarrh often continues for twenty or thirty years without inducing pulmonary consumption, in persons who pursue active occupations.

5. In the hereditary consumption there is either a hereditary debility of the whole system, or a hereditary mal-conformation of the breast. In the latter case, the consumption is the effect of weakness communicated to the whole system, by the long continuance of difficult respiration, or of such injuries being done to the lungs as are incompatible with health and life. It is remarkable, that the consumptive diathesis is more frequently derived from paternal, than maternal ancestors.

6 Physicians, the most distinguished characters, have agreed, that the pulmonary consumption may be communicated by contagion. Under the influence of this belief Morgagni informs us, that Valsalva, who was predisposed to the consumption, constantly avoided being present at the dissection of the lungs of persons who had died of that disease. In some parts of Spain and Portu-

* Pages 7, 8.

gal, its contagious nature is so generally believed, that cases of it are reported to the magistrates of those countries, and the clothes of persons who die of it are burned by their orders. The doctrine of nearly all diseases spreading by contagion, required but a short and simple act of the mind, and favoured the indolence and timidity which characterized the old school of medicine. I adopted this opinion, with respect to the consumption, in the early part of my life; but I have lately been led to call its truth in question, especially in the unqualified manner in which it has been taught. In most of the cases in which the disease has been said to be propagated by contagion, its limits are always confined to the members of a single family. Upon examination, I have found them to depend upon some one or more of the following causes :

1. Mal-conformation of the breast, in all the branches of the diseased family. It is not necessary that this organic predisposition should be hereditary.

2. Upon the debility which is incurred by nursing and the grief which follows the loss of relations who die of it.

3. Upon some local cause undermining the constitution of a whole family. This may be exhalations from a foul cellar, a privy, or a neighbouring mill-pond, but of so feeble a nature as to produce debility only, with an acute fever, and thus to render the consumption a kind of family epidemic. I was consulted, in the month of August, 1793, by a Mr. Gale, of Maryland, in a pulmonary complaint. He informed me, that he had lost several brothers and sisters with the consumption, and that none of his ancestors had died of it. The deceased persons, five in number, had lived in a place that had been subject to the intermitting fever.

4. Upon some peculiar and unwholesome article of diet, which exerts slowly debilitating effects upon all the branches of a family.

5. Upon a fearful and debilitating apprehension entertained by the surviving members of a family, in which one or two have died of consumptions, that they shall perish by the same disease. The effects of all the passions, and especially of fear, acted upon by a lively imagination, in inducing determinations to particular parts of the body,

and subsequent disease, are so numerous, as to leave no doubt of the operation of this cause, in producing a number of successive deaths in the same family, from pulmonary consumption.

In favour of its depending upon one or more of the above causes, I shall add two remarks.

1. There is often an interval of from two to ten years, between the sickness and deaths which occur in families from consumptions, and this we know never takes place in any disease which is admitted to be contagious.

2. The consumption is not singular in affecting several branches of a family. I was lately consulted by a young physician from Maryland, who informed me, that two of his brothers, in common with himself, were afflicted with epilepsy. Madness, scrophula, and a disposition to hæmorrhage, often affect, in succession, several branches of the same family; and who will say that any one of the above diseases is propagated by contagion?

The practice of the Spaniards and Portuguese, in burning the clothes of persons who die of consumptions, no more proves the disease to be contagious, than the same acts sanctioned by the advice or order of public bodies in the United States, establish the contagious nature of the yellow fever. They are, in both countries, marks of the superstition of medicine.

In suggesting these facts, and the inferences which have been drawn from them, I do not mean to deny the possibility of the acid and fœtid vapour, which is discharged by breathing from an ulcer or abscess in the lungs, nor of the hectic sweats, when rendered putrid by stagnating in sheets, or blankets, communicating this disease to persons who are long exposed to them, by sleeping with consumptive patients; but that such cases rarely occur I infer, from the persons affected often living at a distance from each other, or when they live under the same roof, having no intercourse with the sick. This was the case with the black slaves, who were supposed to have taken the disease from the white branches of a family in Connecticut, and which was mentioned, upon the authority of Dr. Beardsley, in a former edition of this inquiry. Admitting the above morbid matters now and then to

act as a remote cause of consumption, it does not militate against the theory I have aimed to establish, for if it follow the analogy of common miasmata and contagions, it must act by first debilitating the whole system. The approach of the jail and bilious fevers is often inculcated by general languor. The influenza and the measles are always accompanied by general debility, but the small pox furnishes an analogy to the case in question more directly in point. The contagion of this disease, whether received by the medium of the air or the skin, never fails of producing weakness in the whole system, before it discovers itself in affections of those parts of the body on which the contagion produced its first operation.

7. I grant that cutaneous humours, and the matter of old sores, when repelled, or suddenly healed, have in some cases fallen upon the lungs, and produced consumption. But I believe, in every case where this has happened the consumption was preceded by general debility, or that it was not induced, until the whole system had been previously debilitated by a tedious and distressing cough.

If the reasonings founded upon the facts which have been mentioned be just, then it follows,

III. That the abscess, cough, tubercles, ulcers, and purulent or bloody discharges which occur in the pulmonary consumption, are the effects, and not the causes of the disease; and, that all attempts to cure it, by inquiring after tubercles and ulcers, or into the quality of the discharge from the lungs, are as fruitless as an attempt would be to discover the causes or cure of dropsies, by an examination of the qualities of collections of water, or to find out the causes and cure of fevers, by the quantity or quality of the discharges which take place in those diseases from the kidneys and skin. It is to be lamented, that it is not in pulmonary consumption only, that the effects of a disease have been mistaken for its cause. Water in the brain, a membrane in the trachea, and a preternatural secretion of bile, have been accused of producing hydrocephalus internus, cyanache trachealis, and bilious fever, whereas we now know they are the effects of those diseases only, in the successive order in which each of them has been mentioned. It is high time to harness the steeds

which drag the car of medicine before, instead of behind it. The earth, in our science, has stood still long enough. Let us at last believe, it revolves round its sun. I admit that the cough, tubercles and ulcers, after they are formed, increase the danger of a consumption, by becoming new causes of stimulus to the system, but in this they are upon a footing with the water, the membrane, and the bile that have been alluded to, which, though they constitute no part of the diseases that produce them, frequently induce symptoms, and a termination of them, wholly unconnected with the original disease.

The tendency of general debility to produce a disease of the lungs appears in many cases, as well as in the pulmonary consumption. Dr. Lind tells us, that the last stage of the jail fever was often marked by a cough. I have seldom been disappointed in looking for a cough and a copious excretion of mucus and phlegm after the 14th or 15th days of a chronic typhus fever. The cases of hypochondriasis under my care, ended in fatal diseases of the lungs. The debility of old age is generally accompanied by a troublesome cough, and the debility which precedes death, generally discovers its last symptoms in the lungs. Hence most people die with what are called the rattles. They are produced by a sudden and copious effusion of mucus in the bronchial vessels of the lungs.

Sometimes the whole force of the consumptive fever falls upon the trachea instead of the lungs, producing in it defluxion, a hawking of blood, and occasionally a considerable discharge of blood, which are often followed by ulcers, and a spitting of pus. I have called it a tracheal, instead of a pulmonary consumption. Many people pass through a long life with a mucous defluxion upon the trachea, and enjoy in other respects tolerable health. In such persons the disease is of a local nature. It is only when it is accompanied with debility of the whole system, that it ends in a consumption. Mr. John Harrison, of the Northern Liberties, died of this disease under my care, in the year 1801, in consequence of the discharge of pus from an ulcer which followed a hæmorrhage from the trachea being suddenly suppressed. I have seen another case of the same kind in a lady in this city, in the year

1797. Dr. Spence, of Dumfries, in Virginia, in a letter which I received from him in June, 1805, describes a case then under his care, of this form of consumption. He calls it, very properly, "*phthisis trachealis*." I have met with two cases of death from this disease, in which there were tubercles in the trachea. The patients breathed with great difficulty, and spoke only in a whisper. One of them died from suffocation. In the other, the tubercle bursted a few days before his death, and discharged a large quantity of *fœtid* matter.

Should it be asked, why does general debility terminate by a disease in the lungs and trachea rather than in any other parts of the body? I answer that it seems to be the law of the system, that general debility should always produce some local disease. This local disease sometimes manifests itself in dyspepsia, as in the general debility which follows grief; sometimes it discovers itself in a diarrhœa, as in the general debility which succeeds to fear. Again it appears in the brain, as in the general debility which succeeds intemperance, and the constant or violent exercise of the understanding, or of stimulating passions; but it more frequently appears in the lungs, as the consequence of general debility. It would seem as if the debility in the cases of consumption is seated chiefly in the blood-vessels, while that debility which terminates in diseases of the stomach and bowels, is confined chiefly to the nerves, and that the local affections of the brain arise from a debility, invading alike the nervous and arterial system. What makes it more probable that the arterial system is merely affected in the consumption is, that the disease most frequently occurs in those periods of life, and in those habits in which a peculiar state of irritability or excitability is supposed to be present in the arterial system; also in those climates in which there are the most frequent vicissitudes in the temperature of the weather. It has been observed, that the debility in the inhabitants of the West Indies, whether produced by the heat of the climate or the excessive pursuits of business or pleasure, generally terminates in dropsy, or in some diseases of the alimentary canal.

I have said, that it seemed to be a law of the system,

that general debility should always produce some local affection. But to this law there are sometimes exceptions : the atrophy appears to be a consumption without an affection of the lungs. This disease is frequently mentioned by the writers of the 16th and 17th centuries by the name of *tabes*. I have seen several instances of it in adults, but more in children, and a greater number in the children of black than of white parents. The hectic fever, and even the night sweat, were as obvious in several of these cases, as in those consumptions, where general debility had discovered itself in an affection of the lungs.

I come now to make a few observations upon the *cure* of consumption; and here I hope it will appear, that the theory which I have delivered admits of an early and very important application to practice.

If the consumption be preceded by general debility, it becomes us to attempt the cure of it before it produce the active symptoms of cough, bloody or purulent discharges from the lungs, and inflammatory or hectic fever. The symptoms which mark its first stage, are too seldom observed ; or if observed, they are too often treated with equal neglect by patient and physician. I shall briefly enumerate these symptoms. They are a slight fever increased by the least exercise ; a burning and dryness in the palms of the hands, more especially towards evening ; rheumy eyes upon waking from sleep ; an increase of urine ; a dryness of the skin, more especially of the feet in the morning ;* an occasional flushing in one, and sometimes in both cheeks ; a hoarseness ;† a slight or acute pain in the breast ; a fixed pain in one side, or shooting pains in both sides ; head-ach ; occasional sick and fainty fits ; a deficiency of appetite, and a general indisposition to exercise or motion of every kind.

It would be easy for me to mention cases in which every symptom that has been enumerated has occurred

* The three last mentioned symptoms are taken notice of by Dr. Ben-net, in his *Treatise upon the Nature and Cure of the Consumption*, as precursors of the disease Dr. Boerhaave used to tell his pupils that they had never deceived him.

† I have seen the hoarseness in one case the first symptom of approaching consumption. In this symptom it preserves the analogy of pneumonia, which often comes on with a hoarseness, and sometimes with paraphonia.

within my own observation. I wish them to be committed to memory by young practitioners; and if they derive the same advantages from attending to them, which I have done, I am sure they will not regret the trouble they have taken for that purpose. It is probable, while a morbid state of the lungs is supposed to be the proximate cause of this disease, they will not derive much reputation or emolument from curing it in its forming stage; but let them remember that in all attempts to discover the causes and cures of diseases, which have been deemed incurable, a physician will do nothing effectual until he acquire a perfect indifference to his own interest and fame.

The remedies for consumption, in this stage of the disease, are simple and certain. They consist in a desertion of all its remote and exciting causes, particularly sedentary employments, damp or cold situations, and whatever tends to weaken the system. When the disease has not yielded to this desertion of its remote and exciting causes, I have recommended the cold bath, steel, and bark with great advantage. However improper, or even dangerous, these remedies may be after the disease assumes an inflammatory or hectic type and produces an affection of the lungs, they are perfectly safe and extremely useful in this state of the system which has been described. The use of the bark will readily be admitted by all those practitioners who believe the pulmonary consumption to depend upon a scrophulous diathesis. Should even the lungs be affected by scrophulous tumours, it is no objection to the use of the bark, for there is no reason why it should not be as useful in scrophulous tumours of the lungs, as of the glands of the throat, provided it be given before those tumours have produced inflammation; and in this case, no prudent practitioner will ever prescribe it in scrophula, when seated even in the external parts of the body. To these remedies should be added a diet moderately stimulating, and gentle exercise. I shall hereafter mention the different species of exercise, and the manner in which each of them should be used, so as to derive the utmost advantage from them. I can say nothing of the use of salt

water or sea air in this stage of the consumption, from my own experience. I have heard them commended by a physician of Rhode-Island; and if they be used before the disease has discovered itself in pulmonary affections, I can easily conceive they may do service.

If the simple remedies which have been mentioned have been neglected, in the first stage of the disease, it generally terminates, in different periods of time, in pulmonary affections, which show themselves under one of the three following forms:

1. A fever, accompanied by a cough, a hard pulse, and a discharge of blood, or mucous matter from the lungs.

2. A fever of the hectic kind accompanied by chilly fits, and night sweats, and a pulse full, quick, and occasionally hard. The discharges from the lungs, in this state of the disease, are frequently purulent.

3. A fever with a weak frequent pulse, a troublesome cough, and copious purulent discharges from the lungs, a hoarse and weak voice, and chilly fits and night sweats alternating with a diarrhœa.

From this short history of the symptoms of pulmonary consumption there are occasional deviations. I have seen four cases, in which the pulse was natural or slower than natural to the last day of life. Mrs. Rebecca Smith, the lovely and accomplished wife of Mr. Robert Smith, of this city, passed through the whole course of this disease, in the year 1802, without a single chilly fit. Two other cases have come under my notice, in which there was not only an absence of chills but of fever and night sweats. A similar case is recorded in the *Memoirs of the Medical Society of London*; and lastly, I have seen two cases which terminated fatally, in which there was neither cough nor fever for several months. One of them was in Miss Mary Loxley, the daughter of the late Mr. Benjamin Loxley, in the year 1785. She had complained of a pain in her right side, and had frequent chills with a fever of the hectic kind. They all gave way to frequent and gentle bleeding. In the summer of 1786, she was seized with the same complaints, and as she had great objections to bleeding, she consult-

ed a physician who gratified her, by attempting to cure her by recommending exercise and country air. In the autumn she returned to the city much worse than when she left it. I was again sent for, and found her confined to her bed with a pain in her right side, but without the least cough or fever. Her pulse was preternaturally slow. She could lie only on her left side. She sometimes complained of acute flying pains in her head, bowels, and limbs. About a month before her death, which was on the 3d of May, 1787, her pulse became quick, and she had a little hecking cough, but without any discharge from the lungs. Upon my first visit to her in the preceding autumn, I told her friends that I believed she had an abscess in her lungs. The want of fever and cough afterwards, however gave me reason to suspect that I had been mistaken. The morning after her death, I received a message from her father, informing me that it had been among the last requests of his daughter, that the cause of her death should be ascertained, by my opening her body. I complied with this request, and, in company with Dr. Hall, examined her thorax. We found the left lobe of the lungs perfectly sound; the right lobe adhered to the pleura, in separating of which, Dr. Hall plunged his hand into a large sac, which contained about half a pint of purulent matter, and which had nearly destroyed the whole substance of the right lobe of the lungs.

I have never seen a dry tongue in any of the forms or stages of this disease.

The three different forms of the pulmonary affection that I have mentioned, have been distinguished by the names of the first, second, and third stages of the consumption; but as they do not always succeed each other in the order in which they have been mentioned, I shall consider them as different states of the system.

The first I shall call the **INFLAMMATORY**, the second the **HECTIC**, and the third the **TYPHUS** state. I have seen the pulmonary consumption come on sometimes with all the symptoms of the second, and sometimes with most of the symptoms of the third state; and I have seen two cases in which a hard pulse, and other symptoms

of inflammatory action, appeared in the last hours of life. It is agreeable to pursue the analogy of this disease with a pneumony, or an acute inflammation of the lungs. They both make their first appearance in the same seasons of the year. It is true the pneumony most frequently attacks with inflammatory symptoms; but it sometimes occurs with symptoms which forbid blood-letting, and I have more than once seen it attended by symptoms which required the use of wine and bark: The pneumony is attended at first by a dry cough, and an expectoration of streaks of blood; the cough in the consumption, in like manner, is at first dry and attended by a discharge of blood from the lungs, which is more copious than in the pneumony, only because the lungs are more relaxed in the former than in the latter disease. There are cases of pneumony in which no cough attends. I have just now mentioned that I had seen the absence of that symptom in pulmonary consumption.

The pneumony terminates in different periods, according to the degrees of inflammation, or the nature of the effusions which take place in the lungs: the same observation applies to the pulmonary consumption. The symptoms of the different forms of pneumony frequently run into each other; so do the symptoms of the three forms of consumption which have been mentioned. In short the pneumony and consumption are alike in so many particulars, that they appear to resemble shadows of the same substance. They differ only as the protracted shadow of the evening does from that of the noon-day sun.

I know that it will be objected here that the consumption is sometimes produced by scrophula, and that this creates an essential difference between it and pneumony. I formerly admitted scrophula to be one of the remote causes of the consumption; but this does not invalidate the parallel which has been given of the two diseases. The phenomena produced in the lungs are the same as to their nature, whether they be produced by the remote cause of scrophula, or by the sudden action of cold and heat upon them.

No more happens in the cases of acute and chronic pneumonia, than what happens in dysentery and rheumatism. These two last diseases are for the most part so acute, as to confine the patient to his bed or his room, yet we often meet with both of them in patients who go about their ordinary business, and in some instances, carry their diseases with them for two or three years.

The parallel which has been drawn between the pneumonia and consumption, will enable us to understand the reason why the latter disease terminates in such different periods of time. The less it partakes of pneumonia, the longer it continues, and vice versa. What is commonly called in this country a galloping consumption, is a disease compounded of different degrees of consumption and pneumonia. It terminates frequently in two or three months, and without many of the symptoms which usually attend the last stage of pulmonary consumption. But there are cases in which patients in a consumption are suddenly snatched away by an attack of pneumonia. I have met with one case only, in which contrary to my expectation the patient mended after an attack of an acute inflammation of the lungs, so as to live two years afterwards.

It would seem from these facts, as if nature had preferred a certain gradation in diseases, as well as in other parts of her works. There is scarcely a disease in which there is not a certain number of grades, which mark the distance between health and the lowest specific deviation from it. Each of these grades has received different names, and has been considered as a distinct disease, but more accurate surveys of the animal economy have taught us, that they frequently depend upon the same original causes, and that they are only greater or less degrees of the same disease.

I shall now proceed to say a few words upon the cure of the different states of pulmonary consumption. The remedies for this purpose are of two kinds, viz. PALLIATIVE and RADICAL. I shall first mention the palliative remedies which belong to each state, and then mention those which are alike proper in them all. The palliative remedies for the

1. OR INFLAMMATORY STATE, are

1. BLOOD-LETTING It may seem strange to recommend this debilitating remedy in a disease brought on by debility. Were it proper in this place, I could prove that there is no disease in which bleeding is prescribed, which is not induced by predisposing debility, in common with the pulmonary consumption. I shall only remark here, that in consequence of the exciting cause acting upon the system (rendered extremely excitable by debility) such a morbid and excessive excitement is produced in the arteries, as to render a diminution of the stimulus of the blood absolutely necessary to reduce it. I have used this remedy with great success, in every case of consumption attended by a hard pulse, or a pulse rendered weak by a laborious transmission of the blood through the lungs. In the months of February and March, in the year 1781, I bled a Methodist Minister, who was affected by this state of consumption, fifteen times in the course of six weeks. The quantity of blood drawn at each bleeding was never less than eight ounces, and it was at all times covered with an inflammatory crust. By the addition of country air, and moderate exercise, to this copious evacuation, in the ensuing spring he recovered his health so perfectly, as to discharge all the duties of his profession for many years, nor was he ever afflicted afterwards with a disease in his breast. I have, in another instance, bled a citizen of Philadelphia eight times in two weeks, in this state of consumption, and with the happiest effects. The blood drawn at each bleeding was always sisy, and never less in quantity than ten ounces. Mr. Tracey of Connecticut informed me, in the spring of 1802, that he had been bled eighty-five times in six months, by order of his physician, Dr. Sheldon, in the inflammatory state of this disease. He ascribed his recovery chiefly to this frequent use of the lancet. To these cases I might add many others of consumptive persons who have been perfectly cured by frequent, and of many others whose lives have been prolonged by occasional bleedings. But I am sorry to add, that I could relate many more cases of consumptive patients, who have died martyrs to their prejudices against the use of this invaluable remedy. A common objection

to it is, that it has been used without success in this disease. When this has been the case, I suspect that it has been used in one of the other two states of pulmonary consumption which have been mentioned, for it has unfortunately been too fashionable among physicians to prescribe the same remedies in every stage and form of the same disease, and this I take to be the reason why the same medicines, which in the hands of some physicians, are either inert or instruments of mischiefs, are, in the hands of others, used with more or less success in every case in which they are prescribed. Another objection to bleeding in the inflammatory state of consumption, is derived from the apparent and even sensible weakness of the patient. The men who urge this objection, do not hesitate to take from sixty to a hundred ounces of blood from a patient in a pneumony, in the course of five or six days, without considering that the debility in the latter case is such as to confine a patient to his bed, while, in the former case, the patient's strength is such as to enable him to walk about his house, and even to attend to his ordinary business. The difference between the debility in the two diseases, consists in its being acute in the one, and chronic in the other. It is true, the preternatural or convulsive excitement of the arteries is somewhat greater in the pneumony, than in the inflammatory consumption; but the plethora, on which the necessity of bleeding is partly founded, is certainly greater in the inflammatory consumption than in pneumony. This is evident from women, and even nurses, discharging from four to six ounces of menstrual blood every month, while they are labouring with the most inflammatory symptoms of the disease; nor is it to be wondered at, since the appetite is frequently unimpaired, and the generation of blood continues to be the same as in perfect health.

Dr. Cullen recommends the use of bleeding in consumptions, in order to lessen the inflammation of the ulcers in the lungs, and thereby to dispose them to heal. From the testimonies of the relief which bleeding affords in external ulcers and tumours accompanied by inflammation, I am disposed to expect the same benefit from it in inflamed ulcers and tumours in the lungs: whether, therefore, we adopt Dr. Cullen's theory of consumption,

and treat it as a local disease, or assent to the one which I have delivered repeated bleedings appear to be equally necessary and useful.

I have seen two cases of inflammatory consumptions, attended by a hæmorrhage of a quart of blood from the lungs. I agreed at first with the friends of these patients in expecting a rapid termination of their disease in death, but to the joy and surprise of all connected with them, they both recovered. I ascribed their recovery wholly to the inflammatory action of their systems being suddenly reduced by a spontaneous discharge of blood. These facts, I hope, will serve to establish the usefulness of blood-letting in the inflammatory state of consumption, with those physicians who are yet disposed to trust more to the fortuitous operations of nature, than to the decisions of reason and experience.

I have always found this remedy to be more necessary in the winter and first spring months than at any other season. We obtain by means of repeated bleedings, such a mitigation of all the symptoms as enables the patient to use exercise with advantage as soon as the weather becomes so dry and settled, as to admit of his going abroad every day.

The relief obtained by bleeding, is so certain in this state of consumption, that I often use it as a palliative remedy, where I do not expect it will perform a cure. I was lately made happy in finding, that I am not singular in this practice. Dr. Hamilton, of Lynn Regis, used it with success in a consumption, which was the effect of a most deplorable scrophula, without entertaining the least hope of its performing a cure.* In those cases where inflammatory action attends the last scene of the disease, there is often more relief obtained by a little bleeding than by the use of opiates, and it is always a more humane prescription, in desperate cases, than the usual remedies of vomits and blisters.

I once bled a sea captain, whom I had declared to be within a few hours of his dissolution, in order to relieve him of uncommon pain, and difficulty in breathing. His pulse was at the same time hard. The evacuation, though

* Observations on Scrophulous Affections.

it consisted of but four ounces of blood, had the wished for effect, and his death, I have reason to believe, was rendered more easy by it. The blood, in this case, was covered with a buffy coat.

The quantity of blood drawn in every case of inflammatory consumption, should be determined by the force of the pulse, and the habits of the patient. I have seldom taken more than eight, but more frequently but six ounces at a time. It is much better to repeat the bleeding once or twice a week, than to use it less frequently, but in larger quantities.

From many years experience of the efficacy of bleeding in this state of consumption, I feel myself authorized to assert, that where a greater proportion of persons die of consumption when it makes its first appearance in the lungs, with symptoms of inflammatory diathesis, than die of ordinary pneumonies (provided exercise be used afterwards,) it must, in nine cases out of ten, be ascribed to the ignorance or erroneous theories of physicians, or to the obstinacy or timidity of patients.

In speaking thus confidently of the necessity and benefits of bleeding in the inflammatory state of consumption, I confine myself to observations made chiefly in the state of Pennsylvania. It is possible the inhabitants of European countries and cities, may so far have passed the simple ages of inflammatory diseases, as never to exhibit those symptoms on which I have founded the indication of blood-letting. I suspect moreover that in most of the southern states of America, the inflammatory action of the arterial system is of too transient a nature to admit of the repeated bleedings in the consumption which are used with so much advantage in the middle and northern states.

In reviewing the prejudices against this excellent remedy in consumptions, I have frequently wished to discover such a substitute for it as would with equal safety and certainty take down the morbid excitement, and action of the arterial system. At present we know of no such remedy; and until it be discovered, it becomes us to combat the prejudices against bleeding; and to derive all the advantages from it which have been mentioned.

2. A second remedy for the inflammatory state of con-

sumption should be sought for in a MILK and VEGETABLE DIET. In those cases where the milk does not lie easy on the stomach, it should be mixed with water, or it should be taken without its cheesy or oily parts, as in whey or butter milk, or it should be taken without scimming; for there are cases in which milk will agree with the stomach in this state, and in no other. The oil of the milk probably helps to promote the solution of its curds in the stomach. It is seldom in the power of physicians to prescribe ass' or goat's milk in this disease; but a good substitute may be prepared for them by adding to cow's milk a little sugar, and a third or fourth part of water, or of a weak infusion of green tea. The quantity of milk taken in a day, should not exceed a pint and even less than that quantity when we wish to lessen the force of the pulse by the abstraction of nourishment. The vegetables which are eaten in this state of the disease, should contain as little stimulus as possible. Rice, in all the ways in which it is usually prepared for aliment, should be preferred to other grains, and the less saccharine fruits to those which abound with sugar. In those cases where the stomach is disposed to dyspepsia, a little salted meat, fish, or oysters, also soft boiled eggs, may be taken with safety, mixed with vegetable aliment. Where there is no morbid affection of the stomach, I have seen the white meats eaten without increasing the inflammatory symptoms of the disease. The transition from a full diet to milk and vegetables should be gradual, and the addition of animal to vegetable aliment, should be made with the same caution. From the neglect of this direction, much error, both in theory and practice, has arisen in the treatment of consumptions.

In every case it will be better for the patients to eat four or five, rather than but two or three meals in a day. A less stimulus is by this means communicated to the system, and less chyle is mixed with the blood in a given time. Of so much importance do I conceive this direction to be, that I seldom prescribe for a chronic disease of any kind without enforcing it.

3. VOMITS have been much commended by Dr. Read in this disease. From their indiscriminate use in every

state of consumption, I believe they have oftener done harm than good. In cases where a patient objects to bleeding or where a physician doubts of its propriety, vomits may always be substituted in its room with great advantage. They are said to do most service when the disease is the effect of a catarrh.

4. NITRE, in moderate doses of ten or fifteen grains, taken three or four times a day, has sometimes been useful in this disease; but it has been only when the disease has appeared with inflammatory symptoms. Care should be taken not to persevere too long in the use of this remedy, as it is apt to impair the appetite. I have known one case in which it produced an obstinate dyspepsia, and a disposition to the cholic; but it removed, at the same time, the symptoms of pulmonary consumption.

5. COLD and DRY AIR when combined with the exercise of walking, deserves to be mentioned as an antiphlogistic remedy. I have repeatedly prescribed it in this species of the consumption with advantage, and have often had the pleasure of finding a single walk of two or three miles in a clear cold day, produce nearly the same diminution of the force and frequency of the pulse, as the loss of six or eight ounces of blood.

I come now to treat of the palliative remedies which are proper in the

II. Or HECTIC STATE of consumption. Here we begin to behold the disease in a new and more distressing form than in the state which has been described. There is in this state of consumption the same complication of inflammatory and typhus diathesis which occurs in the typhoid and puerperile fevers, and of course the same difficulty in treating it successfully; for the same remedies do good and harm, according as the former or latter diathesis prevails in the system

All that I shall say upon this state is, that the treatment of it should be accommodated to the predominance of inflammatory or typhus symptoms, for the hectic state presents each of them alternately every week, and sometimes every day to the hand, or eye of a physician. When a hard pulse with acute pains in the side

and breast occur, bleeding and other remedies for the inflammatory state must be used; but when the disease exhibits a predominance of typhus symptoms, the remedies for that state to be mentioned immediately, should be prescribed in moderate doses. There are several palliative medicines which have been found useful in the hectic state, but they are such as belong alike to the other two states; and therefore they will be mentioned hereafter in a place assigned to them.

I am sorry, however, to add, that where bleeding has not been indicated, I have seldom been able to afford much relief by medicine in this state of consumption. I have used alternately the most gentle, and the most powerful vegetable and metallic tonics to no purpose. Even arsenic has failed in my hands of affording the least alleviation of the hectic fever. I conceive the removal of this fever to be the great desideratum in the cure of the consumption; and should it be found, after all our researches, to exist only in exercise, it will be no departure from a law of nature, for I believe there are no diseases produced by equal degrees of chronic debility, in which medicines are of any more efficacy, than they are in the hectic fever of the pulmonary consumption.

I proceed now to speak of the palliative remedies which are proper in the

III. Or TYPHUS STATE of the pulmonary consumption.

The first of these are STIMULATING MEDICINES. However just the complaints of Dr. Fothergill may be against the use of balsams in the inflammatory and mixed states of the consumption, they appear to be not only safe, but useful likewise, in mitigating the symptoms of weak morbid action in the arterial system. I have therefore frequently prescribed opium, the balsam of copaivæ, of Peru, the oil of amber, and different preparations of turpentine and tar, in moderate doses, with obvious advantage. Garlic, elixir of vitriol, the juice of dandelion, a strong tea made of horehound, and a decoction of the inner bark of the wild cherry tree*, also bitters of all kinds, have all been found

* *Prunus Virginiana*.

safe and useful tonics in this state of consumption. Even the Peruvian bark and the cold bath, so often and so generally condemned in the consumptions are always innocent, and frequently active remedies, where there is a total absence of inflammatory diathesis in this disease. The bark is said to be most useful when the consumption is the consequence of an intermitting fever, and when it occurs in old people. With these remedies should be combined

2. A CORDIAL and STIMULATING DIET. Milk and vegetables, so proper in the inflammatory, are improper, when taken alone, in this state of consumption. I believe they often accelerate that decay of appetite and diarrhœa, which form the closing scene of the disease. I have lately seen three persons recovered from the lowest stage of this state of consumption, by the use of animal food and cordial drinks, aided by frequent doses of opium, taken during the day as well as in the night. I should hesitate in mentioning these cures, had they not been witnessed by more than a hundred students of medicine in the Pennsylvania hospital. The history of one of them is recorded in the 5th volume of the New-York Medical Repository, and of the two others in Dr. Coxe's Medical Museum. Oysters, it has been said, have performed cures of consumption. If they have, it must have been only when they were eaten in that state of it which is now under consideration. They are a most savoury and wholesome article of diet, in all diseases of weak morbid action. To the cordial articles of diet belong sweet vegetable matters. Grapes, sweet apples, and the juice of the sugar maple tree, when taken in large quantities, have all cured this disease.

They all appear to act by filling the blood-vessels, and thereby imparting tone to the whole system. I have found the same advantage from dividing the meals in this state of consumption, that I mentioned under a former head. The exhibition of food in this case, should not be left to the calls of appetite, any more than the exhibition of a medicine. Indeed food may be made to supply the place of cordial medicines, by keeping up a constant and gentle action in the whole system. For

this reason, I have frequently advised my patients never to suffer their stomachs to be empty, even for a single hour. I have sometimes aimed to keep up the influence of a gentle action in the stomach upon the whole system, by advising them to eat in the night, in order to obviate the increase of secretion into the lungs and of the cough in the morning, which are brought on in part by the increase of debility from the long abstraction of the stimulus of aliment during the night.

However safe, and even useful, the cordial medicines and diet that have been mentioned may appear, yet I am sorry to add, that we seldom see any other advantages from them than a mitigation of distressing symptoms, except when they have been followed by suitable and long continued exercise. Even under this favourable circumstance, they are often ineffectual; for there frequently occurs, in this state of consumption, such a destruction of the substance and functions of the lungs, as to preclude the possibility of a recovery by the use of any of the remedies which have been discovered. Perhaps, where this is not the case, their want of efficacy may be occasioned by their being given before the pulse is completely reduced to a typhus state. The weaker the pulse, the greater is the probability of benefit being derived from the use of cordial diet and medicines.

I have said formerly, that the three states of consumption do not observe any regular course in succeeding each other. They are not only complicated in some instances, but they often appear and disappear half a dozen times in the course of the disease according to the influence of the weather, dress, diet, and the passions upon the system. The great secret, therefore of treating this disease consists in accommodating all the remedies that have been mentioned to the predominance of any of the three different states of the system, as manifested chiefly by the pulse. It is in consequence of having observed the evils which have resulted from the ignorance or neglect of this practice, that I have sometimes wished that it were possible to abolish the seducing nomenclature of disease altogether in order there-

by to oblige physicians to conform exactly to the fluctuating state of the system in all their prescriptions; for it is not more certain, that, in all cultivated languages, every idea has its appropriate word, than that every state of a disease has its appropriate dose of medicine, the knowledge and application of which can alone constitute rational, or secure uniformly successful patience.

I come now to say a few words upon those palliative remedies which are alike proper in nearly every state of the pulmonary consumption.

The first remedy under this head is a **DRY SITUATION**. A damp air, whether breathed in a room, or out of doors, is generally hurtful in every form of this disease. A kitchen, or a bed room, below the level of the ground, has often produced, and never fails to increase, a pulmonary consumption. I have often observed a peculiar paleness (the first symptom of general debility) to show itself very early in the faces of persons who work or sleep in cellar kitchens or shops.

2. **COUNTRY AIR**. The higher and drier the situation which is chosen for the purpose of enjoying the benefit of this remedy, the better. Situations exposed to the sea, should be carefully avoided; for it is a singular fact, that while consumptive persons are benefited by the sea-air, when they breath it on the ocean, they are always injured by that portion of it which they breathe on the sea-shore. To show its influence, not only in aggravating consumptions, but in disposing to them, and in adding to the mortality of another disease of the lungs, I shall subjoin the following facts. From one fourth to one half of the adults who die in Great Britain, Dr. Willan says, perish with this disease. In Salem, in the state of Massachusetts which is situated near the sea, and exposed during many months of the year, to a moist east wind, there died, in the year 1799, one hundred and sixty persons; fifty-three died of the consumption, making in all nearly one third of the inhabitants of the town. Eight more died of what is called a lung fever, probably what is called in Pennsylvania the galloping grade of that disease. Consumptions are more frequent in Boston, Rhode Island, and New York, from their

damp winds, and vicinity to the sea-shore, than they are in Philadelphia. In the neighbourhood of Cape May, which lies near the sea-shore of New-Jersey, there are three religious societies, among whom the influenza prevailed in the year 1790. Its mortality, under equal circumstances, was in the exact ratio to their vicinity to the sea. The deaths were most numerous in that society which was nearest to it, and least so in that which was most remote from it. These unfriendly effects of the sea-air, in the above pulmonary diseases, do not appear to be produced simply by its moisture. Consumptions are scarcely known in the moist atmosphere which so generally prevails in Lincolnshire in England, and in the inland parts of Holland and Ireland.

I shall not pause to inquire, why a mixture of land and sea air is so hurtful in the consumption, and at the same time so agreeable to persons in health, and so medicinal in many other diseases, but shall dismiss this head by adding a fact which was communicated to me by Dr. Matthew Irvine, of South-Carolina, and that is, that those situations which are in the neighbourhood of bays or rivers, where the salt and fresh waters mix their streams together, are more unfavourable to consumptive patients than the sea-shore, and therefore should be more carefully avoided by them in exchanging city for country air.

3. A CHANGE OF CLIMATE. It is remarkable that climates uniformly cold and warm, which seldom produce consumptions, are generally fatal to persons who visit them in that disease. Countries between the 30th and 40th degrees of latitude are most friendly to consumptive people.

4. LOOSE DRESSES, AND A CAREFUL ACCOMMODATION OF THEM TO THE CHANGES IN THE WEATHER. Many facts might be mentioned to show the influence of compression and of tight ligatures of every kind, upon the different parts of the body; also of too much, or too little clothing, in producing, or increasing diseases of every kind, more especially those which affect the lungs. Tight stays, garters, waistbands, and collars, should all be laid aside in the consumption, and the quality of the clothing should be suited to the weather. A citizen of Mary-

land informed me, that he twice had a return of a cough and spitting of blood, by wearing his summer clothes a week after the weather became cool in the month of September. But it is not sufficient to vary the weight or quality of dress with the seasons. It should be varied with the changes which take place in the temperature of the air every day, even in the summer months, in middle latitudes. I know a citizen of Philadelphia, who has laboured under a consumptive diathesis near thirty years, who believes that he had lessened the frequency and violence of pulmonic complaints during that time by a careful accommodation of his dress to the weather. He has been observed frequently to change his waistcoat and small clothes twice or three times in a day, in a summer month.

A repetition of colds and thereby an increase of the disease, will be prevented by wearing flannel next to the skin in winter, and muslin in the summer, either in the form of a shirt or of a waistcoat: where these are objected to, a piece of flannel, or of soft sheepskin, should be worn next to the breast. They not only prevent colds, but frequently remove chronic pains from that part of the body.

5. ARTIFICIAL EVACUATIONS, by means of BLISTERS and ISSUES. I suspect the usefulness of these remedies to be chiefly confined to the inflammatory and hectic states of consumption. In the typhus state, the system is too weak to sustain the discharges of either of them. Fresh blisters should be preferred to such as are perpetual, and the issues, to be useful should be large. They are supposed to afford relief by diverting a preternatural secretion and excretion of mucus or pus from the lungs, to an artificial emunctory in a less vital part of the body. Blisters do most service when the disease arises from repelled eruptions, and when they are applied between the shoulders, and the upper and internal parts of the arms. When it arises from rheumatism and gout the blisters should be applied to the joints, and such other external parts of the body as had been previously affected by those diseases.

6. Considerable relief will often be obtained from the patient's SLEEPING BETWEEN BLANKETS in winter, and

ON a MATTRASS in summer. The former prevent fresh cold from night sweats; the latter frequently checks them altogether. In cases where a sufficient weight of blankets to keep up an agreeable warmth cannot be borne, without restraining easy and full acts of inspiration, the patient should sleep under a light feather bed, or an eider down coverlet. They both afford more warmth than double or treble their weight of blankets.

However comfortable this mode of producing warmth in bed may be, it does not protect the lungs from the morbid effects of the distant points of temperature of a warm parlour in the day time, and a cold bed-chamber at night. To produce an equable temperature of air at all hours, I have frequently advised my patients, when going to a warm climate was not practicable to pass their nights as well as days in an open stove room, in which nearly the same degrees of heat were kept up at all hours. I have found this practice, in several cases, a tolerable substitute for a warm climate.

7. The MODERATE use of the lungs, in READING, PUBLIC SPEAKING, LAUGHING, and SINGING. The lungs, when debilitated, derive equal benefit with the limbs, or other parts of the body; from moderate exercise. I have mentioned, in another place,* several facts which support this opinion. But too much pains cannot be taken to inculcate upon our patients to avoid all excess in the use of the lungs, by long or loud reading, speaking, or singing, or by sudden and violent bursts of laughter, I shall long lament the death of a female patient, who had discovered many hopeful signs of a recovery from a consumption, who relapsed, and died, in consequence of bursting a blood-vessel in her lungs, by a sudden fit of laughter.

8. Are there any advantages to be derived from the excitement of certain PASSIONS in the treatment of consumptions? Dr. Blane tells us, that many consumptive persons were relieved, and that some recovered, in consequence of the terror which was excited by a hurricane in Barbadoes, in the year 1780. It will be difficult to imitate, by artificial means, the accidental cures which

* An Account of the Effects of Common Salt in the Cure of Hæmoptysis.
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are recorded by Dr. Blane; but we learn enough from them to inspire the invigorating passions of hope and confidence in the minds of our patients, and to recommend to them such exercises as produce exertions of body and mind analogous to those which are produced by terror. Van Swieten and Smollet relate cures of consumptions, by patients falling into streams of cold water. Perhaps, in both instances, the cures were performed only by the fright and consequent exertion produced by the fall. This is only one instance out of many which might be mentioned, of partial and unequal action being suddenly changed into general and equal excitement in every part of the system. The cures of consumptions which have been performed by a camp life, have probably been much assisted by the commotions in the passions which were excited by the various and changing events of war.

9. SALIVATION has lately been prescribed in this disease with success. An accident first suggested its advantages, in the Pennsylvania hospital, in the year 1800.* Since that time it has performed many cures in different parts of the United States. It is to be lamented that in a majority of the cases in which the mercury has been given, it has failed of exciting a salivation. Where it affects the mouth, it generally succeeds in recent cases, which is more than can be said of any, or of all other remedies for this disease. In its hectic state, a salivation frequently cures, and even in its typhus and last stage, I have more than once prescribed it with success. The same regard to the pulse should regulate the use of this new remedy in consumption, that has been recommended in other febrile diseases. It should never be advised until the inflammatory diathesis of the system has been in a great degree reduced, by the depleting remedies formerly mentioned.

During the use of the above remedies, great care should be taken to relieve the patient from the influence of all those debilitating and irritating causes which induced the disease. I have said elsewhere that decayed teeth are one of them. These should be extracted where there is reason to suspect they have produced, or that they increased the disease.

* Medical Repository of New York. Vol. V.

I have hitherto said nothing of the digitalis as a palliative remedy in pulmonary consumption. I am sorry to acknowledge that, in many cases in which I have prescribed it, it has done no good, and in some it has done harm. From the opposite accounts of physicians of the most respectable characters of the effects of this medicine, I have been inclined to ascribe its different issues, to a difference in the soil in which it has been cultivated, or in the times of gathering, or in the manner of preparing it, all of which we know influence the qualities of many other vegetables. If the theory of consumption which I have endeavoured to establish be admitted, that uncertain and unsafe medicine will be rendered unnecessary by the remedies that have been enumerated, provided they are administered at the times, and in the manner that has been recommended.

Before I proceed to speak of the radical cure of the consumption, it will be necessary to observe, that by means of the palliative remedies which have been mentioned, many persons have been recovered, and some have had their lives prolonged by them for many years; but in most of these cases I have found, upon inquiry, that the disease recurred as soon as the patient left off the use of his remedies, unless they were followed by necessary or voluntary exercise.

It is truly surprising to observe how long some persons have lived who have been affected by a consumptive diathesis, and by frequent attacks of many of the most troublesome symptoms of this disease. Van Swieten mentions the case of a man, who had lived thirty years in this state. Morton relates the history of a man, in whom the symptoms of consumption appeared with but little variation or abatement from his early youth till the 70th year of his age. The widow of the celebrated Senac lived to be eighty-four years of age, thirty of which she passed in a pulmonary consumption. Dr. Nicols was subject to occasional attacks of this disease during his whole life, and he lived to be above eighty years of age. Bennet says he knew an instance in which it continued above sixty years. I prescribed for my first pupil, Dr. Edwards, in a consumption in the year 1769.

He lived until 1802, and seldom passed a year without spitting blood, nor a week without a cough, during that long interval of time. The fatal tendency of his disease was constantly opposed by occasional blood-letting, rural exercises, a cordial but temperate diet, the Peruvian bark, two sea voyages, and travelling in foreign countries. There are besides these instances of long protracted consumptions, cases of it which appear in childhood, and continue for many years. I have seldom known them prove fatal under puberty.

I am led here to mention another instance of the analogy between pneumony and the pulmonary consumption. We often see the same frequency of recurrence of both diseases in habits which are predisposed to them. I have attended a German citizen of Philadelphia, in several fits of the pneumony, who has been confined to his bed eight-and-twenty times, by the same disease, in the course of the same number of years. He has, for the most part, enjoyed good health in the intervals of those attacks, and always appeared, till lately, to possess a good constitution. In the cases of the frequent recurrence of pneumony, no one has suspected the disease to have originated exclusively in a morbid state of the lungs; on the contrary, it appears evidently to be produced by the sudden influence of the same causes, which, by acting with less force, and for a longer time, produce the pulmonary consumption. The name of pneumony is taken from the principal symptom of this disease, but it as certainly belongs to the whole arterial system as the consumption; and I add further, that it is as certainly produced by general predisposing debility. The hardness and fullness of the pulse do not militate against this assertion, for they are altogether the effect of a morbid and convulsive excitement of the sanguiferous system. The strength manifested by the pulse is moreover partial, for every other part of the body discovers, at the same time, signs of extreme debility.

It would be easy, by pursuing this subject a little further, to mention a number of facts which, by the aid of principles in physiology and pathology, which are universally admitted, would open to us a new theory of

fevers, but this would lead us too far from the subject before us. I shall only remark, that all that has been said of the influence of general debilitating causes upon the lungs, both in pneumony and consumption, and of the alternation of the consumption, with other general diseases, will receive great support from considering the lungs only as a part of the whole external surface of the body, upon which most of the remote and exciting causes of both diseases produce their first effects. This extent of the surface of the body, not only to the lungs, but to the alimentary canal, was first taken notice of by Dr. Boerhaave ; but was unhappily neglected by him in his theories of the diseases of the lungs and bowels. Dr. Keil supposes that the lungs, from the peculiar structure of the bronchial vessels, and air vesicles, expose a surface to the action of the air, equal to the extent of the whole external and visible surface of the body.

There are several distressing symptoms which occur in pulmonary consumption that call for relief. These are chiefly a cough, night sweats, and a diarrhoea. The medicines for the cough should be

1. **DEMULCENT TEAS, SYRUPS, and LOZENGES.** These are too common and too numerous to be mentioned. They should be more or less stimulating according to the state of the pulse.

2. **OPIATES.** It is a mistake in practice, founded upon a partial knowledge of the qualities of opium to administer it only at nights, or to suppose that its effects in composing a cough depend wholly upon its inducing sleep. A dose of the same strength should be given every morning, that is given at night, and small doses of it should be given during the day and night, when the cough is troublesome. The practice of giving laudanum in pulmonary consumption early in the morning is strongly recommended by Dr. Sydenham. It is founded alike upon the nature of the disease, and a law in the animal economy mentioned in the Lectures upon animal life, that is, the system in its diurnal revolutions is always in a state of the greatest debility immediately after waking in the morning. A great advantage will

arise from giving the dose of laudanum that is intended to compose the cough at night, early in the evening before the system is excited by an exacerbation of fever. The quantity of this medicine taken at all times should be proportioned to the degrees of action in the arterial system. The less this action the more of it may be taken with safety and advantage. It does most service when given in succession in the different forms of pills, liquid laudanum, and paragoric elixir.

3. Certain FUMIGATIONS and VAPOURS. An accidental cure of a pulmonary consumption by the smoke of rosin in a man who bottled liquors, raised for a while the credit of fumigations. I have tried them, but without much permanent effect. A vapour produced from pouring boiling water upon equal parts of tar and bran, received into the lungs has sometimes given great relief. The sulphurous and saline air of Lybia between mount Vesuvius, and the Mediterranean sea, and the effluvia of the pine forests of Lybia were supposed in ancient times to be powerful remedies in consumptive complaints; but it is probable the exercise used in travelling to those countries, contributed chiefly to the cures which were ascribed to foreign matters acting upon the lungs.

4. Different positions of the body have been found to be more or less favourable to the abatement of the cough. These positions should be carefully sought for, and the body kept in that which procures the most freedom from coughing. I have heard of an instance in which a cough that threatened a return of hæmorrhage from the lungs, was perfectly composed for two weeks by keeping the patient nearly in one posture in bed, but relief is more generally obtained from coughing, by an erect posture of the body.

5. SILENCE. However much moderate speaking, reading, and singing may contribute to strengthen the lungs, there are cases in which a cough is suspended by refraining from them to such a degree, as to employ speech only for the most important purposes of life.

II. NIGHT SWEATS are to be checked by the elixir of vitriol; the nitric acid, drinking a pint of lime water

daily, or instead of it, taking every night at bed time a small tea spoonful of the fine powder of calcined oyster shells, and lastly by eating water mellons. The last remedy acts as a diuretic, and thus diverts the fluids from the skin to the kidneys. The seeds of that pleasant fruit bruised and made into a tea, might be substituted for it at every season of the year, and in every country.

III. A diarrhœa should be restrained by the chalk julep, prepared with laudanum and the tincture of cinnamon, by injections of laudanum into the bowels, and by astringents aliments and drinks.

Thus have I mentioned the usual palliative remedies for the consumption. Many of these remedies, under certain circumstances, I have said have cured the disease, but I suspect that most of these cures have taken place only when the disease has partaken of an intermediate nature between a pneumony and a true pulmonary consumption. Such connecting shades, appear between the extreme points of many other diseases. In a former essay,* I endeavoured to account for the transmutation (if I may be allowed the expression) of the pneumony into the consumption, by ascribing it to the increase of the debilitating refinements of civilized life. This opinion has derived constant support from every observation I have made connected with this subject, since its first publication in the year 1772.

I come now to treat of the RADICAL REMEDIES for the pulmonary consumption.

In a preceding inquiry,† I mentioned the effects of labour, and the hardships of a camp or naval life, upon this disease. As there must frequently occur such objections to each of these remedies, as to forbid their being recommended or adopted, it will be necessary to seek for substitutes for them in the different species of exercise. These are, active, passive, and mixed. The active, includes walking, and the exercise of the hands and feet in working or dancing. The passive includes rock-

* Inquiry into the Diseases and Remedies of the Indians of North America; and a comparative view of their diseases and remedies with those of civilized nations. Vol. I.

† On the Pulmonary Consumption.

ing in a cradle, swinging, sailing, and riding in carriages, of different kinds. The mixed is confined chiefly to riding on horseback.

I have mentioned all the different species of exercise, not because I think they all belong to the class of radical remedies for the consumption, but because it is often necessary to use those which are passive, before we recommend those of a mixed or active nature. That physician does not err more who advises a patient to take physic, without specifying its qualities and doses, than the physician does who advises a patient, in a consumption, to use exercise, without specifying its species and degrees. From the neglect of this direction, we often find consumptive patients injured instead of being relieved by exercises, which, if used with judgment, might have been attended with the happiest effects.

I have before suggested that the stimulus of every medicine, which is intended to excite action in the system, should always be in an exact ratio to its excitability. The same rule should be applied to the stimulus of exercise. I have heard a well-attested case of a young lady, upon whose consumption the first salutary impression was made by rocking her in a cradle; and I know another case in which a young lady, in the lowest state of that debility which precedes an affection of the lungs, was prepared for the use of the mixed and active exercises, by being first moved gently backwards and forwards in a chariot without horses, for an hour every day. Swinging appears to act in the same gentle manner. In the case of a gardener, who was far advanced in a consumption, in the Pennsylvania hospital, I had the pleasure of observing its good effects, in an eminent degree. It so far restored him, as to enable him to complete his recovery by working at his former occupation.

In cases of extreme debility, the following order should be recommended in the use of the different species of exercise.

1. Rocking in a cradle, or riding on an elastic board, commonly called a chamber-horse.
2. Swinging.
3. Sailing.

4. Riding in a carriage.
5. Riding on horseback.
6. Walking.
7. Running and dancing.

In the use of each of those species of exercise great attention should be paid to the degree or force of action with which they are applied to the body. For example, in riding in a carriage, the exercise will be less in a four-wheel carriage than in a single horse chair, and less when the horses move in a walking, than in a trotting gait. In riding on horseback, the exercise will be less or greater according as the horse walks, paces, canters, or trots, in passing over the ground.

I have good reason to believe, that an English sea-captain, who was on the verge of the grave with the consumption, in the spring of the year 1790, owed his perfect recovery to nothing but the above gradual manner, in which, by my advice, he made use of the exercises of riding in a carriage and on horseback. I have seen many other cases of the good effects of thus accommodating exercise to debility; and I am sorry to add, that I have seen many cases in which, from the neglect of this manner of using exercise, most of the species and degrees of it, have either been useless, or done harm. However carelessly this observation may be read by physicians, or attended to by patients, I conceive no direction to be more necessary in the cure of consumptions. I have been thus particular in detailing it, not only because I believe it to be important, but that I might atone to society for that portion of evil which I might have prevented by a more strict attention to it in the first years of my practice.

The more the arms are used in exercise the better. One of the proprietary governors of Pennsylvania, who laboured for many years under a consumptive diathesis, derived great benefit from frequently rowing himself in a small boat, a few miles up and down the river Schuylkill. Two young men, who were predisposed to a consumption, were perfectly cured by working steadily at a printing press in this city. A French physician in Martinique cured this disease, by simply rubbing the arms between

the shoulders and the elbows, until they inflamed. The remedy is strongly recommended, by the recoveries from pulmonary consumption which have followed abscesses in the arm-pits. Perhaps the superior advantages of riding on horseback, in this disease, may arise in part from the constant and gentle use of the arms in the management of the bridle and the whip.

Much has been said in favour of sea voyages in consumptions. In the mild degrees of the disease they certainly have done service, but I suspect the relief given, or the cures performed by them, should be confined chiefly to seafaring people, who add to the benefits of a constant change of pure air, a share of the invigorating exercise of navigating the ship. I have frequently heard of consumptive patients reviving at sea, probably from the transient effects of sea sickness upon the whole system, and growing worse as soon as they come near the end of their voyage. It would seem as if the mixture of land and sea airs was hurtful to the lungs, in every situation and condition in which it could be applied to them. Nor are the peculiar and morbid effects of the first operation of land and sea airs upon the human body, in sea voyages, confined only to consumptive people. I crossed the Atlantic ocean, in the year 1766, with a sea captain, who announced to his passengers the agreeable news that we were near the British coast, before any discovery had been made of our situation by sounding, or by a change in the colour of the water. Upon asking him upon what he founded his opinion, he said, that he had been sneezing, which, he added, was the sign of an approaching cold, and that, in the course of upwards of twenty years, he had never made the land (to use the seaman's phrase) without being affected in a similar manner. I have visited many sick people in Philadelphia soon after arrival from sea, who have informed me, that they had enjoyed good health during the greatest part of their voyage, and that they had contracted their indispositions after they came within sight of the land. I mention these facts only to show the necessity of advising consumptive patients, who undertake a sea voyage for the recovery of their health, not to expose themselves upon deck in the morning and at night, after

they arrive within the region in which the mixture of the land and sea airs may be supposed to take place.

I subscribe, from what I have observed, to the bold declaration of Dr. Sydenham, in favour of the efficacy of riding on horseback, in the cure of consumption. I do not think of the existence of an abscess, when broken or even tubercles in the lungs, when recent, or of a moderate size, the least objection to the use of this excellent remedy. An abscess in the lungs is not necessarily fatal, and tubercles have no malignity in them which should render their removal impracticable by this species of exercise. The first question, therefore, to be asked by a physician who visits a patient in this disease should be, not what is the state of his lungs, but, is he able to ride on horseback.

There are two methods of riding for health in this disease. The first is by short excursions; the second is by long journeys. In slight consumptive affections, and after a recovery from an acute illness, short excursions are sufficient to remove the existing debility; but in the more advanced stages of consumption, they are seldom effectual, and frequently do harm, by exciting an occasional appetite without adding to the digestive powers. They, moreover, keep the system constantly vibrating by their unavoidable inconstancy, between distant points of tone and debility,* and they are unhappily accompanied at all times, from the want of a succession of fresh objects to divert the mind, by the melancholy reflection that they are the sad, but necessary conditions of life.

In a consumption of long continuance or of great danger, long journeys on horseback are the most effectual modes of exercise. They afford a constant succession of fresh objects and company, which divert the mind from dwelling upon the danger of the existing malady; they are moreover attended by a constant change of air, and they are not liable to be interrupted by company, or transient changes in the weather, by which means appetite and digestion, action and power, all keep pace with each other. It is to be lamented that the use of this excellent remedy is fre-

* The bad effects of inconstant exercise have been taken notice of in the gout. Dr. Sydenham says, when it is used only by fits and starts in this disease, it does harm.

quently opposed by indolence and narrow circumstances in both sexes, and by the peculiarity of situation and temper in the female sex. Women are attached to their families by stronger ties than men. They cannot travel alone. Their delicacy, which is increased by sickness, is liable to be offended at every stage; and, lastly, they sooner relax in their exertions to prolong their lives than men. Of the truth of the last observation, sir William Hamilton has furnished us with a striking illustration. He tells us, that in digging into the ruins produced by the late earthquake in Calabria, the women who perished in it, were found with their arms folded, as if they abandoned themselves immediately to despair and death; whereas, the men were found with their arms extended, as if they had resisted their fate to the last moment of their lives. It would seem, from this fact, and many others of a similar nature which might be related, that a capacity of bearing pain and distress with fortitude and resignation, was the distinguishing characteristic of the female mind; while a disposition to resist and overcome evil, belonged in a more peculiar manner to the mind of man. I have mentioned this peculiarity of circumstances and temper in female patients, only for the sake of convincing physicians that it will be necessary for them to add all the force of eloquence to their advice, when they recommend journeys to women in preference to all other remedies, for the recovery of their health.

Persons, moreover, who pursue active employments, frequently object to undertaking journeys, from an opinion that their daily occupations are sufficient to produce all the salutary effects we expect from artificial exercise. It will be highly necessary to correct this mistake by assuring such persons that, however useful the habitual exercise of an active, or even a laborious employment may be to preserve health, it must always be exchanged for one which excites new impressions, both upon the mind and body, in every attempt to restore the system from that debility which is connected with pulmonary consumption.

As travelling is often rendered useless, and even hurtful in this disease, from being pursued in an improper

manner, it will be necessary to furnish our patients with such directions as will enable them to derive the greatest benefit from their journeys. I shall, therefore, in this place, mention the substance of the directions which I have given in writing for many years to such consumptive patients as undertake journeys by my advice.

1. To avoid fatigue. Too much cannot be said to enforce this direction. It is the hinge on which the recovery or death of a consumptive patient frequently turns. I repeat it again, therefore, that patients should be charged over and over when they set off on a journey, as well as when they use exercise of any kind, to avoid fatigue. For this purpose they should begin by travelling only a few miles in a day, and increase the distance of their stages, as they increase their strength. By neglecting this practice, many persons have returned from journeys much worse than when they left home, and many have died in taverns, or at the houses of their friends on the road. Travelling in stage-coaches is seldom safe for a consumptive patient. They are often crowded; they give too much motion; and they afford by their short delays and distant stages, too little time for rest, or for taking the frequent refreshment which was formerly recommended.

2. To avoid travelling too soon in the morning, and after the going down of the sun in the evening, and, if the weather be hot, never to travel in the middle of the day. The sooner a patient breakfasts after he leaves his bed the better; and in no case should he leave his morning stage with an empty stomach.

3. If it should be necessary for a patient to lie down, or to sleep in the day time, he should be advised to undress himself, and to cover his body between sheets or blankets. The usual ligatures of garters, stocks, knee-bands, waitscoats, and shoes, are very unfriendly to sound sleep; hence persons who lie down with their clothes on, often awake from an afternoon's nap in terror from dreams, or in a profuse sweat, or with a head-ach or sick stomach; and generally out of humour. The surveyors are so sensible of the truth of this remark, that they always undress themselves when they sleep in the woods. An intelligent gentleman of this profession informed me, that he had

frequently seen young woodsmen, who had refused to conform to this practice, so much indisposed in the morning, that, after the experience of a few nights, they were forced to adopt it.

Great care should be taken in sleeping, whether in the day time or at night, never to lie down in damp sheets. Dr. Sydenham excepts the danger from this quarter, when he speaks of the efficacy of travelling on horseback in curing the consumption.

4. Patients who travel for health in this disease should avoid all large companies, more especially evening and night parties. The air of a contaminated room, phlogisticated by the breath of fifteen or twenty persons, and by the same number of burning candles, is poison to a consumptive patient. To avoid impure air from every other source, he should likewise avoid sleeping in a crowded room, or with curtains around his bed, and even with a bed-fellow.

5. Travelling, to be effectual in this disease, should be conducted in such a manner as that a patient may escape the extremes of heat and cold. For this purpose he should pass the winter, and part of the spring, in Georgia or South Carolina, and the summer in New Hampshire, Massachusetts, or Vermont, or, if he pleases, he may still more effectually shun the summer heats, by crossing the lakes, and travelling along the shores of the St. Lawrence to the city of Quebec. He will thus escape the extremes of heat and cold, particularly the less avoidable one of heat; for I have constantly found the hot month of July to be as unfriendly to consumptive patients in Pennsylvania, as the variable month of March. By these means too he will enjoy nearly an equable temperature of air in every month of the year; and his system will be free from the inconvenience of the alternate action of heat and cold upon it. The autumnal months should be spent in New Jersey or Pennsylvania.

In these journeys from north to south, or from south to north, he should be careful, for reasons before mentioned, to keep at as great a distance as possible from the sea coast. Should this inquiry fall into the hands of a British physician, I would beg leave to suggest to him,

whether more advantages would not accrue to his consumptive patients from advising them to cross the Atlantic ocean, and afterwards to pursue the tour which I have recommended, than by sending them to Portugal, France, or Italy. Here they will arrive with such a mitigation of the violence of the disease, in consequence of the length of their sea voyage, as will enable them immediately to begin their journeys on horseback. Here they will be exposed to fewer temptations to intemperance, or to unhealthy amusements, than in old European countries. And, lastly, in the whole course of this tour, they will travel among a people related to them by a sameness of language and manners, and by ancient or modern ties of citizenship. Long journeys for the recovery of health, under circumstances, so agreeable, should certainly be preferred to travelling among strangers of different nations, languages, and manners, on the continent of Europe.

6. To render travelling on horseback effectual in a consumption, it should be continued with moderate intervals, from *six to twelve months*. But the cure should not be rested upon a single journey. It should be repeated every *two or three years*, till our patient has passed the consumptive stages of life. Nay, he must do more; he must acquire a *habit* of riding constantly, both at home and abroad; or, to use the words of Dr. Fuller, "he must, like a Tartar, learn to live on horseback, by which means he will acquire in time the constitution of a Tartar."*

Where benefit is expected from a change of climate, as well as from travelling, patients should reside at least two years in the place which is chosen for that purpose. I have seldom known a residence for a shorter time in a foreign climate do much service.

To secure a perfect obedience to medical advice, it would be extremely useful if consumptive patients could always be accompanied by a physician. Celsus says, he found it more easy to cure the dropsy in slaves than in freemen, because they more readily submitted to the restraints he imposed upon their appetites. Madness has

* *Medicina Gymnastica*, p. 116.

become a curable disease in England, since the physicians of that country have opened private mad-houses, and have taken the entire and constant direction of their patients into their own hands. The same successful practice would probably follow the treatment of consumptions, if patients were constantly kept under the eye and authority of their physicians. The keenness of appetite, and great stock of animal spirits, which those persons frequently possess, hurry them into many excesses which defeat the best concerted plans of a recovery; or, if they escape these irregularities, they are frequently seduced from our directions by every quack remedy which is recommended to them. Unfortunately the cough becomes a signal of their disease, at every stage of their journey, and the easy or pleasant prescriptions of even hostlers and ferrymen, are often substituted to the self-denial and exertion which have been imposed by physicians. The love of life in these cases seems to level all capacities; for I have observed persons of the most cultivated understandings to yield in common with the vulgar, to the use of these prescriptions.

In a former volume I mentioned the good effects of accidental LABOUR in pulmonary consumptions. The reader will find a particular account in the first volume of Dr. Coxe's Medical Museum, of a clergyman and his wife, in Virginia, being cured by the voluntary use of that remedy.

The following circumstances and symptoms, indicate the longer or shorter duration of this disease, and its issue in life and death.

The consumption from gout, rheumatism, and scrophula, is generally of long duration. It is more rapid in its progress to death, when it arises from a half cured pleurisy, or neglected colds, measles, and influenza. It is of shorter duration in persons under thirty, than in those who are more advanced in life.

It is always dangerous in proportion to the length of time, in which the debilitating causes, that predisposed to it, have acted upon the body.

It is more dangerous when a predisposition to it has

been derived from ancestors, than when it has been acquired.

It is generally fatal when accompanied with a bad conformation of the breast.

Chilly fits occurring in the forenoon, are more favourable than when they occur in the evening. They indicate the disease to partake a little of the nature of an intermittent, and are a call for the use of the remedies proper in that disease.

Rheumatic pains, attended with an abatement of the cough, or pains in the breast, are always favourable; so are

Eruptions, or an abscess on the external parts of the body, if they occur before the last stage of the disease.

A spitting of blood, in the early, or forming stage of the disease, is favourable, but after the lungs become much obstructed, or ulcerated, it is most commonly fatal.

A pleurisy, occurring in the low state of the disease, generally kills, but I have seen a case in which it suddenly removed the cough and hectic fever, and thus became the means of prolonging the patient's life for several years.

The discharge of calculi from the lungs by coughing and spitting, and of a thin watery liquid, with a small portion of pus swimming on its surface, are commonly signs of an incurable consumption.

No prediction unfavourable to life can be drawn from pus being discharged from the lungs. We see many recoveries after it has taken place, and many deaths where that symptom has been absent. Large quantities of pus are discharged in consumptions attended with abscesses, and yet few die of them, where they have not been preceded by long continued debility of the whole system. No pus is expectorated from tubercles, and how generally fatal is the disease, after they are formed in the lungs! It is only after they ulcerate that they discharge pus, and it is only after ulcers are thus formed, that the consumption probably becomes uniformly fatal. I suspect these ulcers are sometimes of a cancerous nature.

A sudden cessation of the cough, without a supervening diarrhœa, indicates death to be at hand.

A constant vomiting in a consumption, is generally a bad sign.

Feet obstinately cold, also a swelling of the feet during the day, and of the face in the night, commonly indicate a speedy and fatal issue of the disease.

Lice, and the falling off of the hair, often precede death.

A hoarseness, in the beginning of the disease, is always alarming, but it is more so in its last stage.

A change of the eyes from a blue, or dark, to a light colour, similar to that which takes place in very old people, is a sign of speedy dissolution.

I have never seen a recovery after an apthous sore throat took place.

Death from the consumption comes on in some or more than one of the following ways :

1. With a diarrhœa. In its absence.

2. With wasting night sweats.

3. A rupture of an abscess.

4. A rupture of a large blood-vessel in the lungs attended with external or internal hæmorrhage. Sudden and unexpected death in a consumption is generally induced by this or the preceding cause.

5. Madness. The cough and expectoration cease with this disease. It generally carries off the patient in a week or ten days.

6. A pleurisy, brought on by exposure to cold.

7. A typhus fever, attended with tremors, twitchings of the tendons, and a dry tongue.

8. Swelled hands, feet, legs, thighs, and face.

9. An apthous sore throat.

10. Great and tormenting pains, sometimes of a spasmodic nature in the limbs.

In a majority of the fatal cases of consumption, which I have seen, the passage out of life has been attended with pain ; but I have seen many persons die with it, in whom all the above symptoms were so lenient, or so completely mitigated by opium, that death resembled a quiet transition from a waking to a sleeping state.

I cannot conclude this inquiry without adding, that the author of it derived from his paternal ancestors a predisposition to the pulmonary consumption, and that between the 18th and 43d years of his age, he has occasionally been afflicted with many of the symptoms of that disease which he has described. By the constant and faithful use of many of the remedies which he has recommended, he now, at an advanced age, enjoys nearly an uninterrupted exemption from pulmonary complaints. In humble gratitude, therefore, to that BEING, who condescends to be called the preserver of men, he thus publicly devotes this result of his experience and inquiries to the benefit of such of his fellow-creatures as may be afflicted with the same disease, sincerely wishing that they may be as useful to them, as they have been to the author.

OBSERVATIONS
ON THE
CAUSE AND CURE
OF
DROPSIES.

OBSERVATIONS, &c.

WHETHER we admit the exhaling and absorbing vessels to be affected in general dropsies by preternatural debility, palsy, or rupture by a retrograde motion of their fluids, it is certain that their exhaling and absorbing power is materially affected by too much, or too little action in the arterial system. That too little action in the arteries should favour dropsical effusions, has been long observed; but it has been less obvious, that the same effusions are sometimes promoted, and their absorption prevented, by too much action in these vessels. That this fact should have escaped our notice is the more remarkable, considering how long we have been accustomed to seeing serous swellings in the joints in the acute rheumatism and copious, but partial effusions of water in the form of sweat, in every species of inflammatory fever.

It is nothing new that the healthy action of one part, should depend upon the healthy action of another part of the system. We see it in many of the diseases of the nerves and brain. The tetanus is cured by exciting a tone in the arterial system; madness is cured by lessening the action of the arteries by copious blood-letting; and epilepsy and hysteria are often mitigated by the moderate use of the same remedy.

By too much action in the arterial system, I mean a certain morbid excitement in the arteries, accompanied by preternatural force, which is obvious to the sense of touch. It differs from the morbid excitement of the arteries, which takes place in common inflammatory fevers, in being attended by less febrile heat, and with little or no pain in the head or limbs. The thirst is nearly the same in this state of dropsy, as in inflammatory fevers. I include here those dropsies only in which the

whole system is affected by what is called a hydropic diathesis.

That debility should, under certain circumstances, dispose to excessive action, and that excessive action should occur in one part of the body, at the same time that debility prevailed in every other, are abundantly evident from the history and phenomena of many diseases. Inflammatory fever, active hæmorrhages, tonic gout, asthma, apoplexy, and palsy, however much they are accompanied by excessive action in the arterial system, are always preceded by original debility, and are always accompanied by obvious debility in every other part of the system.

But it has been less observed by physicians that an undue force or excess of action occurs in the arterial system in certain dropsies, and that the same theory which explains the union of predisposing and nearly general debility, with a partial excitement and preternatural action in the arterial system, in the diseases before-mentioned, will explain the symptoms and cure of certain dropsies.

That debility predisposes to every state of dropsy, is evident from the history of all the remote and occasional causes which produce them. It will be unnecessary to mention these causes, as they are to be found in all our systems of physic. Nor will it be necessary to mention any proofs of the existence of debility in nearly every part of the body. It is too plain to be denied. I shall only mention the symptoms which indicate a morbid excitement and preternatural action of the arterial system. These are,

1. A hard, full, and quick pulse. This symptom, I believe, is more common in dropsies than is generally supposed, for many physicians visit and examine patients in these diseases without feeling the pulse. Dr. Home mentions the frequency of the pulse, in the patients whose cures he has recorded,* but he takes no notice of its force except in two cases. Dr. Zimmermann, in his account of the dropsy which terminated the life of Frederick II. of Prussia, tells us that he found his pulse hard

* Medical Facts.

and full. I have repeatedly found it full and hard in every form of dropsy, and more especially in the first stage of the disease. Indeed I have seldom found it otherwise in the beginning of the dropsy of the breast.

2. Sisy blood. This has been taken notice of by many practical writers, and has very justly been ascribed, under certain circumstances of blood-letting, to an excessive action of the vessels upon the blood.

3. Alternation of dropsies with certain diseases which were evidently accompanied by excess of action in the arterial system. I have seen anasarca alternate with vertigo, and both ascites and anasarca alternate with tonic madness. A case of nearly the same kind is related by Dr. Mead. Dr. Grimes, of Georgia, informed me that he had seen a tertian fever, in which the intermissions were attended with dropsical swellings all over the body, which suddenly disappeared in every accession of a paroxysm of the fever.

4. The occasional connexion of certain dropsies with diseases evidently of an inflammatory nature, particularly pneumony, rheumatism, and gout.

5. Spontaneous hæmorrhages from the lungs, hæmorrhoidal vessels, and nose, cases of which shall be mentioned hereafter, when we come to treat of the cure of dropsies.

6. The appearance of dropsies in the winter and spring, in habits previously affected by the intermitting fever. The debility produced by this state of fever, frequently disposes to inflammatory diathesis, as soon as the body is exposed to the alternate action of heat and cold, nor is this inflammatory diathesis always laid aside, by the transition of the intermitting fever into a dropsy, in the succeeding cold weather.

7. The injurious effects of stimulating medicines in certain dropsies, prove that there exists in them, at times, too much action in the blood-vessels. Dr. Tissot, in a letter to Dr. Haller, "*De Variolis, apoplexia, et hydrope*," condemns, in strong terms, the use of opium in the dropsy. Now the bad effects of this medicine in dropsies, must have arisen from its having been given in cases of too much action in the arterial system; for opium,

we know, increases, by its stimulating qualities, the action and tone of the blood-vessels, and hence we find, it has been prescribed with success in dropsies of too little action in the system.

8. The termination of certain fevers in dropsies in which blood-letting was not used. This has been ascertained by many observations. Dr. Wilkes relates,* that after "an epidemical fever, which began in Kidderminster, in 1728, and soon afterwards spread, not only over Great Britain, but all Europe, more people died dropsical in three years, than did perhaps in twenty or thirty years before," probably from the neglect of bleeding in the fever.

But the existence of too much action in the arterial system in certain dropsies, will appear more fully from the history of the effects of the remedies which have been employed either by design or accident in the cure of these diseases. I shall first mention the remedies which have been used with success in tonic or inflammatory dropsies; and afterwards mention those which have been given with success in dropsies of a weak action in the arteries. I have constantly proposed to treat only of the theory and cure of dropsies in general, without specifying any of the numerous names it derives from the different parts of the body in which they may be seated; but in speaking of the remedies which have been used with advantage in both the tonic and atonic states, I shall occasionally mention the name or seat of the dropsy in which the remedy has done service.

The first remedy that I shall mention for dropsies is blood-letting. Dr. Hoffman and Dr. Home both cured dropsies accompanied by pulmonic congestion by means of this remedy. Dr. Monroe quotes a case of dropsy from Sponius, in which bleeding succeeded, but not till after it had been used twenty times.† Mr. Cruikshank relates a case‡ of accidental bleeding, which confirms the efficacy of blood-letting in these diseases. He tells us that he attended a patient with dropsical swellings in his legs, who had had a hoarseness for two years. One morning.

* Historical Essay on the Dropsy, p. 326.

† Treatise on the Dropsy. ‡ Treatise on the Lymphatics.

in stooping to buckle his shoes, he bursted a blood-vessel in his lungs, from which he lost a quart of blood; in consequence of which, both the swellings and the hoarseness went off gradually, and he continued well two years afterwards. I have known one case in which spontaneous hæmorrhages from the hæmorrhoidal vessels, and from the nose, suddenly reduced universal dropsical swellings. In this patient there had been an uncommon tension and fullness in the pulse.

I could add the histories of many cures of anasarca and ascites, performed by means of blood-letting, not only by myself, but by a number of respectable physicians in the United States. Indeed I conceive this remedy to be as much indicated by a tense and full pulse in those forms of dropsy, as it is in a pleurisy, or in any other common inflammatory disease.

In those deplorable cases of hydrothorax, which do not admit of a radical cure, I have given temporary relief, and thereby protracted life, by taking away occasionally a few ounces of blood. Had Dr. Zimmerman used this remedy in the case of the king of Prussia, I cannot help thinking from the account which the doctor gives us of the diet and pulse of his royal patient, that he would have lessened his sufferings much more than by plentiful doses of dandelion; for I take it for granted, from the candour and integrity which the doctor discovered in all his visits to the king, that he did not expect that dandelion, or any other medicine would cure him.

Although a full and tense pulse is always an indication of the necessity of bleeding; yet I can easily conceive there may be such congestions, and such a degree of stimulus to the arterial system, as to produce a depressed, or a low or weak pulse. Two cases of this kind are related by Dr. Monroe, one of which was cured by bleeding. The same symptom of a low and weak pulse is often met with in the first stage of pneumony, and apoplexy, and is only to be removed by the plentiful use of the same remedy.

- II. Vomits have often been given with advantage in dropsies. Dr. Home says, that squills were useful in these diseases only when they produced a vomiting. By

abstracting excitement and action from the arterial system, it disposes the lymphatics to absorb and discharge large quantities of water. The efficacy of vomits in promoting the absorption of stagnating fluids is not confined to dropsies. Mr. Hunter was once called to visit a patient in whom he found a bubo in such a state that he purposed to open it the next day. In the mean while, the patient went on board of a vessel, where he was severely affected by sea-sickness and vomiting; in consequence of which the bubo disappeared, and the patient recovered without the use of the knife.

Mr. Cruikshank further mentions a case* of a swelling in the knee being nearly cured by a patient vomiting eight and forty hours, in consequence of his taking a large dose of the salt of tartar instead of soluble tartar.

III. Purges. The efficacy of this remedy, in the cure of dropsies, has been acknowledged by physicians in all ages and countries. Jalap, calomel, scammony, and gamboge, are often preferred for this purpose; but I have heard of two cases of ascites being cured by a table spoonful of sweet oil taken every day. It probably acted only as a gentle laxative. The cream of tartar, so highly commended by Dr. Home, seems to act chiefly in the same way. Gherlius, from whom Dr. Home learned the use of this medicine, says, that all the persons whom he cured by it were in the vigour of life, and that their diseases had been only of a few months continuance. From these two circumstances, it is most probable they were dropsies of great morbid action in the arterial system. He adds further, that the persons who were cured by this medicine, were reduced very low by the use of it. Dr. Home says that it produced the same effect upon the patients whom he cured by it, in the infirmary of Edinburgh. Dr. Sydenham prefers gentle to drastic purges, and recommends the exhibition of them every day. Both drastic and gentle purges act by diminishing the action of the arterial system, and thereby promote the absorption and discharge of water. That purges promote absorption, we learn not only from their effects in dropsies, but from

* Letter to Mr. Clare, p. 166.

an experiment related by Mr. Cruikshank,* of a man who acquired several ounces of weight after the operation of a purge. The absorption in this case was from the atmosphere. So great is the effect of purges in promoting absorption, that Mr. Hunter supposes the matter of a gonorrhœa, or of topical venereal ulcers to be conveyed by them in some instances into every part of the body.

IV. Certain medicines, which, by lessening the action of the arterial system, favour the absorption and evacuation of water. The only medicines of this class which I shall name, are nitre, cream of tartar, and foxglove.

1. Two ounces of nitre dissolved in a pint of water, and a wine-glass full of it taken three times a-day have performed perfect cures, in two cases of ascites, which have come under my notice. I think I have cured two persons of anasarca, by giving one scruple of the same medicine three times a-day for several weeks. The two last cures were evidently dropsies of violent action in the arterial system. Where nitre has been given in atonic dropsies it has generally been useless, and sometimes done harm. I have seen one instance of an incurable diarrhœa after tapping, which I suspected arose from the destruction of the tone of the stomach and bowels, by large and long continued doses of nitre, which the patient had previously taken by the advice of a person who had been cured by that remedy. To avoid this, or any other inconvenience from the use of nitre in dropsies, it should be given at first in small doses, and should always be laid aside, if it should prove ineffectual after having been given two or three weeks.

2. I can say nothing of the efficacy of cream of tartar in dropsies from my own experience, where it has not acted as a purge. Perhaps my want of decision upon this subject has arisen only from my not having persisted in the use of it for the same length of time which is mentioned by Dr. Home.

3. There are different opinions concerning the efficacy of foxglove in dropsies. From the cases related by Dr. Withering, it appears to have done good; but from

* Letter to Mr. Clare, p. 117.

those related by Dr. Lettsom* it seems to have done harm. I suspect the different accounts of those two gentlemen have arisen from their having given it in different states of the system, or perhaps from a difference in the quality of the plant from causes mentioned in another place.† I am sorry to add further, that after many trials of this medicine I have failed in most of the cases in which I have given it. I have discharged the water in three instances by it, but the disease returned, and my patients finally died. I can ascribe only one complete cure to its use, which was in the year 1789, in a young man in the Pennsylvania hospital, of five and thirty years of age, of a robust habit, and plethoric pulse.

Where medicines have once been in use, and afterwards fall into disrepute, as was the case with the foxglove, I suspect the cases in which they were useful, to have been either few or doubtful, and that the cases in which they have done harm, were so much more numerous and unequivocal, as justly to banish them from the *materia medica*.

V. Hard labour, or exercise in such a degree as to produce fatigue, have, in several instances, cured the dropsy. A dispensary patient, in this city, was cured of this disease by sawing wood. And a patient in an ascites under my care in the Pennsylvania hospital, had his belly reduced seven inches in circumference in one day, by the labour of carrying wood from the yard into the hospital. A second patient belonging to the Philadelphia dispensary was cured by walking to Lancaster, sixty-six miles from the city, in the middle of winter. The efficacy of travelling in this disease, in cold weather, is taken notice of by Dr. Monroe, who quotes a case from Dr. Holler, of a French merchant, who was cured of dropsy by a journey from Paris to England, in the winter season. It would seem, that in these two cases, the cold co-operated as a sedative with the fatigue produced by labour or exercise, in reducing the tone of the arterial system.

* Medical Memoirs, vol. II.

† Inquiry into the Causes and Cure of Pulmonary Consumption.

VI. Low diet. I have heard of a woman who was cured of a dropsy by eating nothing but boiled beans for three weeks, and drinking nothing but the water in which they had been boiled. Many other cases of the good effects of low diet in dropsies are to be found in the records of medicine.

VII. Thirst. This cruel remedy acts by debilitating the system in two ways : 1st, by abstracting the stimulus of distension ; and, 2dly, by preventing a supply of fresh water to replace that which is discharged by the ordinary emunctories of nature.

VIII. Fasting. An accidental circumstance, related by sir John Hawkins, in the life of Dr. Johnson, first led me to observe the good effects of fasting in the dropsy. If the fact alluded to stood alone under the present head of this essay, it would be sufficient to establish the existence of too much action, and the efficacy of debilitating remedies in certain dropsies. I am the more disposed to lay a good deal of stress upon this fact, as it was the clue which conducted me out of the labyrinth of empirical practice, in which I had been bewildered for many years, and finally led me to adopt the principles and practice which I am now endeavouring to establish. The passage which contains this interesting fact is as follows : “ A few days after (says sir John) he “ [meaning Dr. Johnson] sent for me, and informed “ me, that he had discovered in himself the symptoms “ of a dropsy, and, indeed, his very much increased bulk “ and the swollen appearance of his legs, seemed to indicate no less. It was on Thursday that I had this “ conversation with him ; in the course thereof he declared, that he intended to devote the whole of the “ next day to fasting, humiliation, and such other devotional exercises as became a man in his situation. On “ the Saturday following I made him a visit, and, upon “ entering his room, I observed in his countenance such “ a serenity as indicated, that some remarkable crisis “ of his disease had produced a change in his feelings. “ He told me that, pursuant to the resolution he had “ mentioned to me, he had spent the preceding day in “ an abstraction from all worldly concerns ; that to pre-

“vent interruption he had in the morning ordered Frank
“ [his servant] not to admit any one to him, and, the
“ better to enforce the charge, had added these awful
“ words, *for your master is preparing himself to die.*
“ He then mentioned to me, that in the course of this
“ exercise, he found himself relieved from the disease
“ which had been growing upon him, and was becoming
“ very oppressive, viz. the dropsy, by the gradual evacua-
“ tion of water, to the amount of twenty pints, a like in-
“ stance whereof he had never before experienced.”
Sir John Hawkins ascribes this immense discharge of
water to the influence of Dr. Johnson’s prayers; but he
neglects to take notice, that these prayers were answered,
in this instance, as they were in many others, in a perfect
consistence with the common and established laws of
nature.

To satisfy myself that this discharge of water, in the
case of Dr. Johnson, was produced by the fasting only,
I recommended it, soon after I read the above account,
to a gentlewoman whom I was then attending in an ascites.
I was delighted with the effects of it. Her urine, which
for some time before had not exceeded half a pint a-day,
amounted to two quarts on the day she fasted. I repeated
the same prescription once a week for several weeks,
and each time was informed of an increase of urine,
though it was considerably less in the last experiments
than in the first. Two patients in an ascites, to whom I
prescribed the same remedy, in the Pennsylvania hospital,
the one in the winter of 1790, and the other in the
winter of 1792, exhibited proofs in the presence of many
of the students of the university, equally satisfactory of
the efficacy of fasting in suddenly increasing the quantity
of urine.

IX. Fear. This passion is evidently of a debilitating
nature, and, therefore, it has frequently afforded an acci-
dental aid in the cure of dropsies, of too much action.
I suspect, that the fear of death, which was so distin-
guishing a part of the character of Dr. Johnson, added
a good deal to the efficacy of fasting, in procuring the
immense discharge of water before-mentioned. In support
of the efficacy of fear simply applied, in discharging

water from the body in dropsies, I shall mention the following facts.

In a letter which I received from Dr. John Pennington, dated Edinburgh, August 3, 1790, I was favoured with the following communication. "Since the conversation I had with you on the subject of the dropsy, I feel more and more inclined to adopt your opinion. I can furnish you with a fact which I learned from a Danish sailor, on my passage to this country, which is much in favour of your doctrine. A sailor in an ascites, fell off the end of the yard into the sea; the weather being calm, he was taken up unhurt, but, to use the sailor's words, who told me the story, he was frightened half to death, and as soon as he was taken out of the water, he discharged a gallon of urine or more. A doctor on board ascribed this large evacuation to sea bathing, and accordingly ordered the man to be dipped in the sea every morning, much against his will, for, my informant adds, that he had not forgotten his fall, and that in four weeks he was perfectly well. I think this fact can only be explained on your principles. The sedative operation of fear was, no doubt, the cause of his cure."

There is an account of an ascites being cured by a fall from an open chaise, recorded in the third volume of the Medical Memoirs, by M. Lowdell. I have heard of a complete recovery from dropsy, having suddenly followed a fall from a horse. In both these cases, the cures were probably the effects of fear.

Dr. Hall, of York-town, in Pennsylvania, informed me, that he had been called to visit a young woman of 19 years of age, who had taken all the usual remedies for ascites without effect. He at once proposed to her the operation of tapping. To this she objected, but so great was the fear of this operation, which the proposal of it suddenly excited in her mind, that it brought on a plentiful discharge of urine, which in a few days perfectly removed her disease.

On the 27th of August, 1790, I visited a gentlewoman in this city with the late Dr. Jones, in an ascites. We told her for the first time, that she could not be

relieved without being tapped. She appeared to be much terrified upon hearing our opinion, and said that she would consider of it. I saw her two days afterwards, when she told me, with a smile on her countenance, that she hoped she should get well without tapping, for that she had discharged two quarts of water in the course of the day after we had advised her to submit to that operation. For many days before, she had not discharged more than two or three gills in twenty-four hours. The operation, notwithstanding, was still indicated, and she submitted to be tapped a few days afterwards.

I tapped the same gentlewoman a second time, in January, 1791. She was much terrified while I was preparing for the operation, and fainted immediately after the puncture was made. The second time that I visited her after the operation was performed, she told me (without being interrogated on that subject), that she had discharged a pint and a half of urine within twenty minutes after I left the room on the day I tapped her. What made this discharge the more remarkable was, she had not made more than a table spoonful of water in a day, for several days before she was tapped.

I have seen similar discharges of urine in two other cases of tapping which have come under my notice, but they resembled so nearly those which have been mentioned, that it will be unnecessary to record them.

But the influence of fear upon the system, in the dropsy, extends far beyond the effects which I have ascribed to it. Dr. Currie, of this city, informed me that he called, some years ago, by appointment, to tap a woman. He no sooner entered the room than he observed her, as he thought, to faint away. He attempted to recover her, but to no purpose. She died of a sudden paroxysm of fear.

It is a matter of surprise, that we should have remained so long ignorant of the influence of fear upon the urinary organs in dropsies, after having been so long familiar with the same effect of that passion in the hysteria.

X. A recumbent posture of the body. It is most useful when the dropsy is seated in the lower limbs. I

have often seen, with great pleasure, the happiest effects from this prescription in a few days.

XI. Punctures. These, when made in the legs and feet, often discharge in eight and forty hours the water of the whole body. I have never seen a mortification produced by them. As they are not followed by inflammation, they should be preferred to blisters, which are sometimes used for the same purpose.

I cannot dismiss the remedies which discharge water from the body through the urinary passages, without taking notice, that they furnish an additional argument in favour of blood-letting in dropsies, for they act, not by discharging the stagnating water, but by creating such a plentiful secretion in the kidneys from the serum of the circulating blood, as to make room for the absorption and conveyance of the stagnating water in the blood-vessels.

Now the same effect may be produced in all tonic or inflammatory dropsies, with more certainty and safety, by means of blood-letting.

In recommending the antiphlogistic treatment of certain dropsies, I must here confine myself to the dropsies of such climates as dispose to diseases of great morbid action in the system. I am satisfied that it will often be proper in the middle and eastern states of America; and I have lately met with two observations, which show that it has been used with success at Vienna, in Germany. Dr. Stoll tells us, that, in the month of January, 1780, "Hydropic and asthmatic patients discovered more or less marks of inflammatory diathesis, and that blood was drawn from them with a sparing hand with advantage;" and in the month of November, of the same year, he says, "The stronger diuretics injured dropsical patients in this season; but an antiphlogistic drink, composed of a quart of the decoction of grass, with two ounces of simple oxymel, and nitre and cream of tartar, of each a drachm, did service." It is probable that the same difference should be observed between the treatment of dropsies in warm and cold

* Ratio Medendi Nosocomio Practico Vindobonensi. vol. iv. p. 56 and 99.

climates that is observed in the treatment of fevers. The tonic action probably exists in the system in both countries. In the former it resembles the tides which are suddenly produced by a shower of rain, and as suddenly disappear; whereas, in the latter, it may be compared to those tides which are produced by the flow and gradual addition of water from numerous streams, and which continue for days and weeks together to exhibit marks of violence in every part of their course.

I come now to say a few words upon atonic dropsies, or such as are accompanied with a feeble morbid action in the blood-vessels. This morbid action is essential to the nature of dropsies, for we never see them take place without it. This is obvious from the absence of swellings after famine, marasmus, and in extreme old age, in each of which there exists the lowest degree of debility, but no morbid action in the blood-vessels. These atonic or typhus dropsies may easily be distinguished from those which have been described by occurring in habits naturally weak; by being produced by the operation of chronic causes; by a weak and quick pulse; and by little or no preternatural heat or thirst.

The remedies for atonic dropsies are all such stimulating substances as increase the action of the arterial system, or determine the fluids to the urinary organs. These are,

I. Bitter and aromatic substances of all kinds, exhibited in substance or in infusions of wine, spirit, beer, or water.

II. Certain acrid vegetables, such as scurvy-grass, horseradish, mustard, water-cresses, and garlic. I knew an old man who was perfectly cured of an anasarca, by eating water-cresses, on bread and butter.

III. Opium. The efficacy of this medicine in dropsies has been attested by Dr. Willis, and several other practical writers. It seems to possess almost an exclusive power of acting alike upon the arterial, the lymphatic, the glandular, and the nervous systems.

IV. Metallic tonics, such as chalybeate medicines of all kinds, and the mild preparations of copper and mercury. I once cured an incipient ascites and anasarca by large do-

ses of the rust of iron ; and I have cured many dropsies by giving mercury in such quantities as to excite a plentiful salivation. I have, it is true, often given it without effect, probably from my former ignorance of the violent action of the arteries, which so frequently occurs in dropsies, and in which cases mercury must necessarily have done harm.

V. Diuretics, consisting of alkaline salts, nitre, and the oxymels of squills and colchicum. It is difficult to determine how far these medicines produce their salutary effects by acting directly upon the kidneys. It is remarkable that these organs are seldom effected in dropsies, and that their diseases are rarely followed by dropsical effusions in any part of the body.

VI. Generous diet, consisting of animal food, rendered cordial by spices ; also sound old wine.

VII. Diluting drinks taken in such large quantities as to excite the action of the vessels by the stimulus of distention. This effect has been produced, sir George Baker informs us, by means of large draughts of simple water, and of cyder and water.* The influence of distention in promoting absorption is evident in the urinary and gall bladders, which frequently return their contents to the blood by the lymphatics, when they are unable to discharge them through their usual emunctories. Is it not probable that the distention produced by the large quantities of liquids which we are directed to administer after giving the foxglove, may have been the means of performing some of those cures of dropsies, which have been ascribed to that remedy ?

VIII. Pressure. Bandages bound tightly around the belly and limbs, sometimes prevent the increase or return of dropsical swellings. The influence of pressure upon the action of the lymphatics appears in the absorption of bone which frequently follows the pressure of contiguous tumours, also in the absorption of flesh which follows the long pressure of certain parts of the body upon a sick bed.

* The remark upon this fact by sir George, is worthy of notice, and implies much more than was probably intended by it. "When common means have failed, success has sometimes followed a method directly "contrary to the established practice." Medical Transactions, vol. II.

IX. Frictions, either by means of a dry, or oiled hand, or with linen or flannel impregnated with volatine and other stimulating substances. I have found evident advantages from following the advice of Dr. Cullen. by rubbing the lower extremities upwards, and that only in the morning. I have been at a loss to account for the manner in which sweet oil acts, when applied to dropsical swellings. If it act by what is improperly called a sedative power upon the blood-vessels, it will be more proper in tonic than atonic dropsies; but if it act by closing the pores, and thereby preventing the absorption of moisture from the air, it will be very proper in the state of dropsy which is now under consideration. It is in this manner that Dr. Cullen supposes that sweet oil, when applied to the body, cures that state of diabetes in which nothing but insipid water is discharged from the bladder.

X. Heat, applied either separately or combined with moisture in the form of warm or vapour baths, has been often used with success in dropsies of too little action. Dampier, in his voyage round the world, was cured of a dropsy by means of a copious sweat, excited by burying himself in a bed of warm sand. Warm fomentations to the legs, rendered moderately stimulating by the addition of saline or aromatic substances, have often done service in the atonic dropsical swellings in the lower extremities.

XI. The cold bath. I can say nothing in favour of the efficacy of this remedy in dropsies, from my own experience. Its good effects seem to depend wholly on its increasing the excitability of the system to common stimuli, by the diminution of its excitement. If this be the case, I would ask, whether fear might not be employed for the same purpose, and thus become as useful in atonic, as it was formerly proved to be in tonic dropsies?

XII. Wounds, whether excited by cutting instruments or by fire, provided they excite inflammation and action in the arteries, frequently cure atonic dropsies. The good effects of inflammation and action in these cases, appear in the cure of hydrocele by means of the needle, or the caustic.

XIII. Exercise. This is probably as necessary in the atonic dropsy as it is in the consumption, and should never

be omitted when a patient is able to take it. The passive exercises of swinging, and riding in a carriage, are most proper in the lowest stage of the disease ; but as soon as the patient's strength will admit of it, he should ride on horseback. A journey should be preferred, in this disease, to short excursions from home.

XIV. A recumbent posture of the body should always be advised during the intervals of exercise, when the swellings are seated in the lower extremities.

XV. Punctures in the legs and feet afford the same relief in general dropsy, accompanied with a weak action in the blood vessels, that has been ascribed to them in dropsies of an opposite character.

In the application of each of the remedies which have been mentioned, for the cure of both tonic and atonic dropsies, great care should be taken to use them in such a manner, as to accommodate them to the strength and excitability of the patient's system. The most powerful remedies have often been rendered hurtful, by being given in too large doses in the beginning, and useless, by being given in too small doses in the subsequent stages of the disease.

I have avoided saying any thing of the usual operations for discharging water from different parts of the body, as my design was to treat only of the symptoms and cure of those dropsies which affect the whole system. I shall only remark, that if tapping and punctures have been more successful in the early, than in the late stages of these diseases, it is probably because the sudden or gradual evacuation of water takes down that excessive action in the arterial system, which is most common in their early stage, and thereby favours the speedy restoration of healthy action in the exhaling or lymphatic vessels.

Thus have I endeavoured to prove, that two different states of action take place in dropsies, and have mentioned the remedies which are proper for each of them under separate heads. But I suspect that dropsies are often connected with a certain intermediate or mixed action in the arterial system, analogous to the typhoid action which takes place in certain fevers. I am led to adopt this opinion, not only from having observed mixed action to

be so universal in most of the diseases of the arterial and nervous system, but because I have so frequently observed dropsical swellings to follow the scarlatina, and the puerperile fever, two diseases which appear to derive their peculiar character from a mixture of excessive and moderate force, combined with irregularity of action in the arterial system. In dropsies of mixed action, where too much force prevails in the action of some, and too little in the action of other of the arterial fibres, the remedies must be debilitating or stimulating according to the greater or less predominance of tonic or atonic diathesis in the arterial system.

I shall conclude this history of dropsies, and of the different and opposite remedies which have cured them, by the following observations.

1. We learn, in the first place, from what has been said, the impropriety and even danger of prescribing stimulating medicines indiscriminately in every case of dropsy.

2. We are taught, by the facts which have been mentioned, the reason why physicians have differed so much in their accounts of the same remedies, and why the same remedies have operated so differently in the hands of the same physicians. It is because they have been given without a reference to the different states of the system, which have been described. Dr. Sydenham says, that he cured the first dropsical patient he was called to, by frequent purges. He began to exult in the discovery, as he thought, of a certain cure for dropsies, but his triumph was of short duration. The same remedy failed in the next case in which he prescribed it. The reason probably was, the dropsy in the first case was of a tonic, but in the second of an atonic nature; for the latter was an ascites from a quartan ague. It is agreeable, however, to discover, from the theory of dropsies which has been laid down, that all the different remedies for these diseases have been proper in their nature, and improper only in the state of the system in which they have been given. As the discovery of truth in religion reconciles the principles of the most opposite sects, so the discovery of truth in medicine reconciles the most opposite modes of practice. It would

be happy if the inquirers after truth in medicine should be taught by such discoveries, to treat each other with tenderness and respect, and to wait with patience till accident, or time, shall combine into one perfect and consistent system, all the contradictory facts and opinions, about which physicians have been so long divided.

3. If a state of great morbid action in the arteries has been demonstrated in dropsies, both from its symptoms and remedies, and if these dropsies are evidently produced by previous debility, who will deny the existence of a similar action in certain hæmorrhages, in gout, palsy, apoplexy, and madness, notwithstanding they are all the offspring of predisposing debility? And who will deny the efficacy of bleeding, purges, and other debilitating medicines in certain states of those diseases, that has seen the same medicines administered with success in certain dropsies? To reject bleeding, purging, and the other remedies for violent action in the system, in any of the above diseases, because that action was preceded by general debility, will lead us to reject them in the most acute inflammatory fevers, for these are as much the offspring of previous debility as dropsies or palsy. The previous debility of the former differs from that of the latter diseases, only in being of a more acute, or in other words, of a shorter duration.

4. From the symptoms of tonic dropsy which have been mentioned, it follows, that the distinction of apoplexy into serous and sanguineous, affords no rational indication for a difference in the mode of treating that disease. If an effusion of serum in the thorax, bowels, or limbs, produce a hard and full pulse, it is reasonable to suppose that the same symptom will be produced by the effusion of serum in the brain. But the dissections collected by Lieutaud* place this opinion beyond all controversy. They prove that the symptoms of great and feeble morbid action, as they appear in the pulse, follow alike the effusion of serum and blood in the brain. This fact will admit of an important application to the disease, which is to be the subject of the next inquiry.

* *Historia Anatomico Medica*, vol. II.

5. From the influence which has been described, of the different states of action of the arterial system, upon the lymphatic vessels, in dropsies, we are led to reject the indiscriminate use of bark, mercury, and salt water, in the scrophula. When the action of the arteries is weak, those remedies are proper; but when an opposite state of the arterial system occurs, and, above all, when scrophulous tumours are attended with inflammatory ulcers, stimulating medicines of all kinds are hurtful. By alternating the above remedies with a milk and vegetable diet, according to the tonic, or atonic states of the arterial system, I have succeeded in the cure of a case of scrophula, attended by large ulcers in the inguinal glands, which had for several years resisted the constant use of the three stimulating remedies which have been mentioned.

6. Notwithstanding I have supposed dropsies to be connected with a peculiar state of force in the blood-vessels, yet I have not ventured to assert, that dropsies may not exist from an exclusive affection of the exhaling and absorbing vessels. I conceive this to be as possible, as for a fever to exist from an exclusive affection of the arteries, or a hysteria from an exclusive affection of the nervous system. Nothing, however, can be said upon this subject, until physiology and pathology have taught us more of the structure and diseases of the lymphatic vessels. Nor have I ventured further to assert, that there are not medicines which may act specifically upon the lymphatics, independently of the arteries. This I conceive to be as possible as for *asafoetida* to act chiefly upon the nerves, or *ipecacuanha* and *jalap* upon the alimentary canal, without affecting other parts of the system. Until such medicines are discovered, it becomes us to avail ourselves of the access to the lymphatics which is furnished through the medium of the arteries, by means of most of the remedies which have been mentioned.

7. If it should appear hereafter, that we have lessened the mortality of certain dropsies by the theory and practice which have been proposed, yet many cases of dropsy must still occur in which they will afford us no aid. The cases I allude to are dropsies from enclosing cysts, from

the ossification of certain arteries, from schirri of certain viscera from large ruptures of exhaling or lymphatic vessels, from a peculiar and corrosive acrimony of the fluids, and, lastly, from an exhausted state of the whole system. The records of medicine furnish us with instances of death from each of the above causes. But let us not despair. It becomes a physician to believe, that there is no disease necessarily incurable: and that there exist in the womb of time certain remedies for all those morbid affections, which elude the present limits of the healing art.

AN INQUIRY
INTO
THE CAUSE AND CURE
OF THE
INTERNAL DROPSY
OF THE BRAIN.

AN INQUIRY, &c.

HAVING, for many years, been unsuccessful in all the cases, except two, of internal dropsy of the brain, which came under my care, I began to entertain doubts of the common theory of this disease, and to suspect that effusion of water should be considered only as the effect of a primary disease in the brain.

I mentioned this opinion to my colleague, Dr. Wistar, in the month of June, 1788, and delivered it the winter following in my lectures. The year afterwards I was confirmed in it, by hearing that the same idea had occurred to Dr. Quin. I have since read Dr. Quin's treatise on the dropsy of the brain with great pleasure, and consider it as the first dawn of light which has been shed upon it. In pursuing this subject, therefore, I shall avail myself of Dr. Quin's discoveries, and endeavour to arrange the facts and observations I have collected in such a manner, as to form a connected theory from them, which I hope will lead to a new and more successful mode of treating this disease.

I shall begin this inquiry by delivering a few general propositions.

1. The internal dropsy of the brain is a disease confined chiefly to children.

2. In children the brain is larger in proportion to other parts of the body, than it is in adults; and of course a greater proportion of blood is sent to it in childhood, than in the subsequent periods of life. The effects of this determination of blood to the brain appear in the mucous discharge from the nose, and in the sores on the head and behind the ears which are so common in childhood.

3. In all febrile diseases, there is a preternatural determination of blood to the brain. This occurs in a more

especial manner in children; hence the reason why they are so apt to be affected by convulsions in the eruptive fever of the small-pox, in dentition, in the diseases from worms, and in the first paroxysms of intermitting fevers.

4. In fevers of every kind, and in every stage of life, there is a disposition to effusion in that part to which there is the greatest determination. Thus, in inflammatory fever, effusions take place in the lungs and in the joints. In the bilious fever they occur in the liver, and in the gout in every part of the body. The matter effused is always influenced by the structure of the part in which it takes place.

These propositions being premised, I should have proceeded to mention the remote causes of this disease; but as this inquiry may possibly fall into the hands of some gentlemen who may not have access to the description of it as given by Dr. Whytt, Dr. Fothergill, and Dr. Quin, I shall introduce a history of its symptoms taken from the last of those authors. I prefer it to the histories by Dr. Whytt and Dr. Fothergill, as it accords most with the ordinary phenomena of this disease in the United States.

“ In general, the patient is at first languid and inactive, “ often drowsy and peevish, but at intervals cheerful and “ apparently free from complaint. The appetite is weak, “ a nausea, and, in many cases, a vomiting, occurs once “ or twice in the day, and the skin is observed to be hot and “ dry towards the evenings; soon after these symptoms “ have appeared, the patient is affected with a sharp head- “ ache, chiefly in the fore-part, or, if not there, generally “ in the crown of the head: it is sometimes, however, “ confined to one side of the head, and, in that case, when “ the posture of the body is erect, the head often inclines “ to the side affected. We frequently find, also, that the “ head-ach alternates with the affection of the stomach; “ the vomiting being less troublesome when the pain is “ most violent, and vice versa, other parts of the body “ are likewise subject to temporary attacks of pain, viz. “ the extremities, or the bowels, but more constantly the “ back of the neck, and between the scapulæ; in all such “ cases the head is more free from uneasiness.”

“ The patient dislikes the light at this period ; cries much, sleeps little, and when he does sleep, he grinds his teeth, picks his nose, appears to be uneasy, and starts often, screaming as if he were terrified ; the bowels are in the majority of cases very much confined, though it sometimes happens that they are in an opposite state ; the pulse in this early stage of the disorder, does not usually indicate any material derangement.

“ When the symptoms above-mentioned have continued for a few days, subject as they always are in this disease to great fluctuation, the axis of one eye is generally found to be turned in towards the nose ; the pupil on this side is rather more dilated than on the other ; and when both have the axis directed inwards (which sometimes happens) both pupils are larger than they are observed to be in the eyes of healthy persons ; the vomiting becomes more constant, and the head-ach more excruciating ; every symptom of fever then makes its appearance, the pulse is frequent, and the breathing quick ; exacerbations of the fever take place towards the evening, and the face is occasionally flushed ; usually one cheek is much more affected than the other ; temporary perspirations likewise break forth, which are not followed by any alleviation of distress ; a discharge of blood from the nose, which sometimes appears about this period, is equally inefficacious.

“ Delirium, and that of the most violent kind, particularly if the patient has arrived at the age of puberty, now takes place, and with all the preceding symptoms of fever, continues for a while to increase, until about fourteen days, often a much shorter space of time, shall have elapsed since the appearance of the symptoms, which were first mentioned in the above detail.

“ The disease then undergoes that remarkable change, which sometimes suddenly points out the commencement of what has been called its second stage : the pulse becomes slow but unequal, both as to its strength, and the intervals between the pulsations ; the pain of the head, or of whatever part had previously been affected, seems to abate, or at least the patient becomes apparently less sensible of it ; the interrupted slumbers, or per-

“petual restlessness which prevailed during the earlier
“periods of the disorder, are now succeeded by an al-
“most lethargic torpor, the strabismus, and dilatation of
“the pupil increase, the patient lies with one, or both
“eyes half closed, which when minutely examined, are
“often found to be completely insensible to light; the
“vomiting ceases; whatever food or medicine is offered
“is usually swallowed with apparent voracity; the bowels
“at this period generally remain obstinately costive.

“If every effort made by art fails to excite the sinking
“powers of life, the symptoms of what has been called
“the second stage are soon succeeded by others, which
“more certainly announce the approach of death. The
“pulse again becomes equal, but so weak and quick,
“that it is almost impossible to count it; a difficulty of
“breathing, nearly resembling the stertor apoplecticus,
“is often observed; sometimes the eyes are suffused
“with blood, the flushing of the face is more frequent
“than before, but of shorter duration, and followed by a
“deadly paleness; red spots, or blotches, sometimes ap-
“pear on the body and limbs; deglutition becomes dif-
“ficult, and convulsions generally close the scene. In
“one case, I may observe, the jaws of a child of four
“years of age were so firmly locked for more than a day
“before death, that it was impossible to introduce either
“food or medicine into his mouth; and in another case,
“a hæmiplegia, attended with some remarkable circum-
“stances, occurred during the two days preceding dis-
“solution.

“Having thus given an exact history of apoplexia
“hydrocephalica, as I could compile from the writings
“of others, and from my own observations, I should
“think myself guilty of imposition on my readers, if I
“did not caution them that it must be considered merely
“as a general outline; the human brain seems to be so
“extremely capricious (if the expression may be allowed)
“in the signals it gives to other parts of the system, of
“the injury it suffers throughout the course of this dis-
“ease, that although every symptom above-mentioned
“does occasionally occur, and indeed few cases of the
“disease are to be met with, which do not exhibit many

“ of them ; yet it does not appear to me, that any one of them is constantly and inseparably connected with it.”

To this history I shall add a few facts, which are the result of observations made by myself, or communicated to me by my medical brethren. These facts will serve to show that there are many deviations from the history of the disease which has been given, and that it is indeed, as Dr. Quin has happily expressed it, of “ a truly proteiform” nature.

I have not found the dilated and insensible pupil, the puking, the delirium, or the strabismus, to attend universally in this disease.

I saw one case in which the appetite was unimpaired from the first to the last stage of the disease.

I have met with one case in which the disease was attended by blindness, and another by double vision.

I have observed an uncommon acuteness in hearing to attend two cases of this disease. In one of them the noise of the sparks which were discharged from a hiccory fire, produced great pain and startings which threatened convulsions.

I have seen three cases in which the disease terminated in hemiplegia. In two of them it proved fatal in a few days ; in a third it continued for nearly eighteen months.

I have met with one case in which no preternatural slowness or intermission was ever perceived in the pulse.

I have seen the disease in children of nearly all ages. I once saw it in a child of six weeks old. It was preceded by the cholera infantum. The sudden deaths which we sometimes observe in infancy, I believe, are often produced by this disease. Dr. Stoll is of the same opinion. He calls it, when it appears in this form, “ apoplexia infantilis.”*

In the month of March, 1771, I obtained a gill of water from the ventricles of the brain of a negro girl of nine years of age, who died of this disease, who complained in no stage of it of a pain in her head or limbs, nor of a sick stomach. The disease in this case was

* Prælectiones, vol. I. p. 254.

introduced suddenly by a pain in the breast, a fever, and the usual symptoms or a catarrh.

Dr. Wistar informed me, that he had likewise met with a case of internal dropsy of the brain, in which there was a total absence of pain in the head.

Dr. Carson informed me, that he had attended a child in this disease that discovered, for some days before it died, the symptoms of hydrophobia.

Dr. Currie obtained, by dissection, seven ounces of water from the brain of a child which died of this disease; in whom, he assured me, no dilatation of the pupil, strabismus, sickness, or loss of appetite had attended, and but very little head-ach.

The causes which induce this disease, act either *directly* on the brain, or *indirectly* upon it, through the medium of the whole system.

The causes which act *directly* on the brain are falls or bruises upon the head, certain positions of the body, and childish plays, which bring on congestion or inflammation, and afterwards an effusion of water in the brain. I have known it brought on in a child by falling into a cellar upon its feet.

The *indirect* causes of this disease are more numerous, and more frequent, though less suspected, than those which have been mentioned. The following diseases of the whole system appear to act indirectly in producing an internal dropsy of the brain.

1 *Intermitting, remitting, and continual* fevers. Of the effects of these fevers in inducing this disease, many cases are recorded by Lieutaud.*

My former pupil, Dr. Woodhouse, has furnished me with a dissection, in which the disease was evidently the effect of the remitting fever. That state of continual fever which has been distinguished by the name of typhus, is often the remote cause of this disease. The languor and weakness in all the muscles of voluntary motion, the head ach, the inclination to rest and sleep, and the disposition to be disturbed, or terrified by dreams, which are said to be the precursors of water in the brain, I believe are frequently symptoms of a typhus

*Historia Antomica-Medica, vol. II.

fever, which terminates in an inflammation, or effusion of water in the brain. The history which is given of the typhus state of fever in children by Dr. Butter,* seems to favour this opinion.

2. The *rheumatism*. Of this I have known two instances. Dr. Lettsom has recorded a case from the same cause.† The pains in the limbs, which are supposed to be the effect, I suspect are frequently the cause of the disease.

3. The *pulmonary consumption*. Of the connection of this disease with an internal dropsy of the brain, Dr. Percival has furnished us with the following communication:‡ “Mr. C——’s daughter, aged nine years, after “labouring under the phthisis pulmonalis four months, “was affected with unusual pains in her head. These “rapidly increased, so as to occasion frequent screamings. “The cough, which had before been extremely violent, “and was attended with stitches in the breast, now “abated, and in a few days ceased almost entirely. The “pupils of the eyes became dilatated, a strabismus ensued, “and in about a week death put an end to her agonies. “Whether this affection of the head arose from the “effusion of water or of blood, is uncertain, but its “influence on the state of the lungs is worthy of notice.” Dr. Quin likewise mentions a case from Dr. Cullen’s private practice, in which an internal dropsy of the brain followed the pulmonary consumption. Lieutaud mentions three cases of the same kind,§ and two, in which it succeeded a catarrh.||

4. *Eruptive fevers*. Dr. Odier informs us,¶ that he had seen four cases in which it had followed the small-pox, measles, and scarlatina. Dr. Lettsom mentions a case in which it followed the small-pox,** and I have seen one in which it was obviously the effects of debility induced upon the system by the measles.

5. *Worms*. Notwithstanding the discharge of worms

* Treatise on the Infantile Remitting Fever.

† Medical Memoirs, vol. I. p. 174.

‡ Essays, Medical, Philosophical and Experimental, vol. II. p. 339,

340.

§ Historia Anatomica-Medica, vol. II. lib. tertius, obs. 380, 394, 1121.

|| Obs 383, 431. ¶ Medical Journal,

** Medical Memoirs vol. I. p. 171.

gives no relief in this disease, yet there is good reason to believe, that it has in some instances, been produced by them. The morbid action continues in the brain as in other cases of the disease, after the cause which induced it has ceased to act upon the body.

6. From the dissections of Lieutaud, Quin, and others, it appears further, that the internal dropsy of the brain has been observed to succeed each of the following diseases, viz. the colic, palsy, melancholy, dysentery, dentition, insolation, and scrofula, also the sudden healing of old sores. I have seen two cases of it from the last cause, and one in which it was produced by the action of the vernal sun alone upon the system.

From the facts which have been enumerated, and from dissections to be mentioned hereafter it appears, that the disease in its first stage is the effect of causes which produce a less degree of that morbid action in the brain which constitutes phrenitis, and that its second stage is the effect of a less degree of that effusion, which produces serous apoplexy in adults. The former partakes of the nature of the chronic inflammation of Dr. Cullen, and of the asthenic inflammation of Dr. Brown. I have taken the liberty to call it *phrenicula*, from its being a diminutive species or state of phrenitis. It bears the same relation to the phrenitis when it arises from indirect causes, which pneumonica does to pneumony; and it is produced nearly in the same manner as the pulmonary consumption by debilitating causes which act primarily on the whole system. The peculiar size and texture of the brain seem to invite the inflammation and effusions which follow debility, to that organ in childhood, just as the peculiar structure and situation of the lungs invite the same morbid phenomena to them, after the body has acquired its growth, in youth and middle life. In the latter stage which has been mentioned, the internal dropsy of the brain partakes of some of the properties of apoplexy. It differs from it in being the effect of a *slow*, instead of a *sudden* effusion of water or blood, and in being the effect of causes which are of an acute instead of a chronic nature. In persons advanced beyond middle life, who are affected by this disease, it approaches

to the nature of the common apoplexy, by a speedy termination in life or death. Dr. Cullen has called it simply by the name of "apoplexia hydrocephalica." I have preferred for its last stage the term *chronic apoplexy*; for I believe with Dr. Quin, that it has no connection with a hydropic diathesis of the whole system. I am forced to adopt this opinion, from my having rarely seen it accompanied by dropsical effusions in other parts of the body, nor a general dropsy accompanied by an internal dropsy of the brain. No more occurs in this disease than takes place when hydrothorax follows an inflammation of the lungs, or when serous effusions follow an inflammation of the joints. I do not suppose that both inflammation and effusion always attend in this disease; on the contrary, dissections have shown some cases of inflammation, with little or no effusion, and some of effusion without inflammation. Perhaps this variety may have been produced by the different stages of the disease in which death and the inspection of the brain took place. Neither do I suppose, that the two stages which have been mentioned, always succeed each other in the common order of inflammation and effusion. In every case where the full, tense, slow and intermitting pulse occurs, I believe there is inflammation; and as this state of the pulse occurs in most cases in the beginning of the disease, I suppose the inflammation, in most cases, to precede the effusion of water. I have met with only one case in which the slow and tense pulse was absent; and out of six dissections of patients whom I have lost by this disease, the brains of four of them exhibited marks of inflammation.

Mr. Davis discovered signs of inflammation, after death from this disease to be universal. In eighteen or twenty dissections, he tells us, he found the pia mater always distended with blood.* Where signs of inflammation have not occurred, the blood-vessels had probably relieved themselves by the effusion of serum, or the morbid action of the blood-vessels had exceeded that grade of excitement, in which only inflammation can take place. I have seen one case of death from this disease, in which there was not more than a tea-spoonful of water in the

* Medical Journal, vol. VIII.

ventricles of the brain. Dr. Quin mentions a similar case. Here death was induced by simple excess of excitement. The water which is found in the ventricles of the brain refuses to coagulate by heat, and is always pale in those diseases, in which the serum of the blood, in every part of the body, is of a yellow colour.

In addition to these facts, in support of the internal dropsy of the brain being the effect of inflammation, I shall mention one more communicated to me in a letter, dated July 17th, 1795, by my former pupil Dr. Coxe, while he was prosecuting his studies in London. "It so happened (says my ingenious correspondent,) that at the time of my receiving your letter, Dr. Clark was at the hospital. I read to him that part which relates to your success in the treatment of hydrocephalus internus. He was so much pleased with it, and mentioned to me a fact which strongly corroborates your idea of its being a primary inflammation of the brain. This fact was, that upon opening, not long since, the head of a child that had died of this disease, he found between three and four ounces of water in the ventricles of the brain; also an inflammatory crust on the optic nerves, as thick as he had ever observed it on the intestines in a state of inflammation. The child lost its sight before it died. The crust accounted in a satisfactory manner for its blindness. Perhaps something similar may always be noticed in the dissections of such as die in this disease, in whom the eyes are much affected."

Having adopted the theory of this disease, which I have delivered, I resolved upon such a change in my practice as should accord with it. The first remedy indicated by it was

I. *Blood-letting*. I shall briefly mention the effects of this remedy in a few of the first cases in which I prescribed it.

CASE I.

On the 15th of November, 1790, I was called to visit the daughter of William Webb, aged four years, who was indisposed with a cough, a pain in her bowels, a coma

great sensibility of her eyes to light, costiveness, and a suppression of urine, a slow and irregular, but tense pulse, dilated pupils, but no head-ach. I found, upon inquiry, that she had received a hurt on her head by a fall, about seven weeks before I saw her. From this information, as well as from her symptoms, I had no doubt of the disease being the internal dropsy of the brain. I advised the loss of five ounces of blood, which gave her some relief. The blood was sizzly. The next day she took a dose of jalap and calomel, which operated twelve times. On the 18th she lost four ounces more of blood, which was more sizzly than that drawn on the 15th. From this time she mended rapidly. Her coma left her on the 20th, and her appetite returned; on the 21st she made a large quantity of turbid dark coloured urine. On the 22d her pulse became again a little tense, for which she took a gentle puke. On the 23d she had a natural stool. On the 24th her pupils appeared to be contracted to their natural size, and on the 30th I had the pleasure of seeing her seated at a tea-table in good health. Her pulse notwithstanding, was a little more active and tense than natural.

CASE II.

On the 24th of the same month, I was called to visit the son of John Cypher, in South-street, aged four years, who had been hurt about a month before, by a wound on his forehead with a brick-bat, the mark of which still appeared. He had been ill for near two weeks with coma, head-ach, colic, vomiting, and frequent startings in his sleep. His evacuations by stool and urine were suppressed; he had discharged three worms, and had had two convulsion fits just before I saw him. The pupil of the right eye was larger than that of the left. His pulse was full, tense, and slow, and intermitted every *fourth* stroke. The symptoms plainly indicated an internal dropsy of the brain. I ordered him to lose four or five ounces of blood. But three ounces of blood were drawn, which produced a small change in his pulse. It rendered the intermission of a pulsation perceptible only after every tenth stroke. On the 25th he lost five ounces of blood, and took a

purge of calomel and jalap. On the 26th he was better. On the 27th the vomiting was troublesome, and his pulse was still full and tense, but regular. I ordered him to lose four ounces of blood. On the 28th his puking and head-ach continued; his pulse was a little tense, but regular; and his right pupil less dilated. On the 29th his head-ach and puking ceased, and he played about the room. On the 4th of December he grew worse; his head-ach and puking returned, with a hard pulse, for which I ordered him to lose five ounces of blood. On the 5th he was better, but on the 6th his head-ach and puking returned. On the 7th, I ordered his forehead to be bathed frequently with vinegar, in which ice had been dissolved. On the 8th he was much better. On the 9th his pulse became soft, and he complained but little of head-ach. After appearing to be well for near three weeks, except that he complained of a little head ach on the 29th his pulse became again full and tense, for which I ordered him to lose six ounces of blood, which for the first time discovered a buffy coat. After this last bleeding, he discharged a large quantity of water. From this time he recovered slowly, but his pulse was a little fuller than natural on the 19th of January following. He afterwards enjoyed good health.

CASES III. AND IV.

In the month of March, 1792, I attended two children of three years of age, the one the daughter of William King, the other the daughter of William Blake: each of whom had most of the symptoms of the inflammatory stage of the internal dropsy of the brain. I prescribed the loss of four ounces of blood, and a smart purge in both cases, and in the course of a few days had the pleasure of observing all the symptoms of the disease perfectly subdued in each of them.

CASE V.

In the months of July and August, 1792, I attended a female slave of Mrs. Oneal, of St. Croix, who had an

obstinate head-ach, coma, vomiting, and a tense, full and *slow* pulse. I believed it to be the phrenicula, or internal dropsy of the brain, in its inflammatory stage. I bled her five times in the course of two months, and each time with obvious relief of all the symptoms of the disease. Finding that her head-ach, and a disposition to vomit, continued after the tension of her pulse was nearly reduced, I gave her as much calomel as excited a gentle salivation, which in a few weeks completed her cure.

CASE VI.

The daughter of Robert Moffat, aged eight years, in consequence of the suppression of a habitual discharge from sores on her head, in the month of April, 1793, was affected by a violent head-ach, puking, great pains and weakness in her limbs, and a full, tense, and *slow* pulse. I believed these symptoms to be produced by an inflammation of the brain. I ordered her to lose six or seven ounces of blood, and gave her two purges of jalap and calomel, which operated very plentifully. I afterwards applied a blister to her neck. In one week from the time of my first visit to her she appeared to be in perfect health.

CASE VII.

A young woman of eighteen years of age, a hired servant in the family of Mrs. Elizabeth Smith, had been subject to a head-ach every spring for several years. The unusual warm days which occurred in the beginning of April, 1793, produced a return of this periodical pain. On the eighth of the month, it was so severe as to confine her to her bed. I was called to visit her on the ninth. I found her comatose, and, when awake, delirious. Her pupils were unusually dilated, and insensible to the light. She was constantly sick at her stomach, and vomited frequently. Her bowels were obstinately costive, and her pulse was full, tense, and so slow as seldom to exceed, for several days, from 56 to 60 strokes in a minute. I ordered her to lose ten ounces of blood every day, for three days successively, and gave her, on each of those days, strong doses of jalap and aloes. The last blood which

was drawn from her was sizy. The purges procured from three to ten discharges every day from her bowels. On the 12th, she appeared to be much better. Her pulse was less tense, and beat 80 strokes in a minute. On the 14th, she had a fainting fit. On the 15th, she sat up, and called for food. The pupils of her eyes now recovered their sensibility to light, as well as their natural size. Her head-ach left her, and on the 17th she appeared to be in good health. Her pulse, however, continued to beat between 50 and 60 strokes in a minute, and retained a small portion of irregular action for several days after she recovered.

I am the more disposed to pronounce the cases which have been described to have been internal dropsy of the brain, from my having never been deceived in a single case in which I have examined the brains of patients whom I have suspected to have died of it.

I could add many other cases to those which have been related, but enough, I hope, have been mentioned to establish the safety and efficacy of the remedies that have been recommended.

I believe, with Dr. Quin, that this disease is much more frequent than is commonly supposed. I can recollect many cases of anomalous fever and head-ach in children, which have excited the most distressing apprehensions of an approaching internal dropsy of the brain, but which have yielded in a few days to bleeding, or to purges and blisters. I think it probable, that some or perhaps, most of these cases, might have terminated in an effusion of water in the brain, had they been left to themselves, or not been treated with the above remedies. I believe further, that it is often prevented by all those physicians who treat the first stage of febrile diseases in children with evacuations, just as the pulmonary consumption is prevented by bleeding, and low diet, in an inflammatory catarrh.

Where blood-letting has failed of curing this disease, I am disposed to ascribe it to its being used less copiously than the disease required. If its relation to pneumonics be the same in its cure, that I have supposed it to be in its cause, then I am persuaded, that the same excess in blood-letting is indicated in it, above what is necessary in

phrenitis, that has been practiced in pneumonics, above what is necessary in the cure of an acute inflammation of the lungs. The continuance, and, in some instances, the increase of the appetite in the internal dropsy of the brain, would seem to favour this opinion no less in this disease, than in the inflammatory state of pulmonary consumption. The extreme danger from the effusion of water into the ventricles of the brain, and the certainty of death from its confinement there, is a reason likewise why more blood should be drawn in this disease, than in diseases of the same force in other parts of the body, where the products of inflammation have a prompt, or certain outlet from the body. Where the internal dropsy is obviously the effect of a fall, or of any other cause which acts *directly* on the brain, there can be no doubt of the safety of very plentiful bleeding; all practical writers upon surgery concur in advising it. The late Dr. Pennington favoured me with an extract from Mr. Cline's manuscript lectures upon anatomy, delivered in London, in the winter of 1792, which places the advantage of blood-letting, in that species of inflammation which follows a local injury of the brain, in a very strong point of light. "I know," says he "that several practitioners object to the use of evacuations as remedies for concussions of the brain, because of the weakness of the pulse; but in these cases the pulse is *depressed*. Besides, experience shows, that evacuations are frequently attended with very great advantages. I remember a remarkable case of a man in this [St. Thomas's] hospital, who was under the care of Mr. Baker. He lay in a comatose state for three weeks after an injury of the head. During that time he was bled *twenty* times, that is to say, he was bled once every day upon an average. He was bled twice a day *plentifully*, but towards the conclusion he was bled more sparingly, and only every other day; but at each bleeding, there were taken upon an average, about sixteen ounces of blood. In consequence of this treatment, the man perfectly recovered his health and reason."

Local bleeding by cups, leaches, scarifications, or arteriotomy, should be combined with venesection, or preferred to it, where the whole arterial system does not sympathize with the disease in the brain.

II. A second remedy to be used in the second stage of this disease is *purges*. I have constantly observed all the patients whose cases have been related, to be relieved by plentiful and repeated evacuations from the bowels. I was led to the use of frequent purges, by having long observed their good effects in palsies, and other cases of congestion in the brain, where blood-letting was unsafe, and where it had been used without benefit. In the Leipsic Commentaries,* there is an account of a case of internal dropsy of the brain, which followed the measles, being cured by no other medicines than purges and diuretics. I can say nothing in favour of the latter remedy, in this disease, from my own experience. The foxglove has been used in this city by several respectable practitioners, but, I believe, in no instance with any advantage.

III. *Blisters* have been uniformly recommended by all practical writers upon this disease. I have applied them to the head, neck, and temples, and generally with obvious relief to the pain in the head. They should be omitted in no stage of the disease; for even in its inflammatory stage, the discharge they occasion from the vessels of the head, greatly overbalances their stimulating effects upon the whole system.

IV. *Mercury* was long considered as the only remedy, which gave the least chance of a recovery from a dropsy of the brain. Out of all the cases in which I gave it, before the year 1790, I succeeded in but two; one of them was a child of three years old, the other was a young woman of twenty-six years of age. I am the more convinced that the latter case was internal dropsy of the brain, from my patient having relapsed, and died between two or three years afterwards, of the same disease. Since I have adopted the depleting remedies which have been mentioned, I have declined giving mercury altogether, except when combined with some purging medicine, and I have given it in this form chiefly with a view of dislodging worms. My reasons for not giving it as a sialagogue are the uncertainty of its operation, its frequent inefficacy when it excites a salivation, and, above all, its disposition to produce gangrene in the tender jaws of

* Vol. xxix. p. 139.

children. Seven instances of its inducing death from that cause, in children between three and eight years of age, and with circumstances of uncommon distress, have occurred in Philadelphia since the year 1795.

V. *Linen cloths*, wetted with cold vinegar, or water, and applied to the forehead, contribute very much to relieve the pain in the head. In the case of Mr. Cypher's son,* the solution of ice in the vinegar appeared to afford the most obvious relief of this distressing symptom.

A puncture in the brain has been proposed by some writers to discharge the water from its ventricles. If the theory I have delivered be true, the operation promises nothing, even though it could always be performed with perfect safety. In cases of local injuries, or of inflammation from any cause, it must necessarily increase the disease; and in cases of effusion only, the debilitated state of the whole system forbids us to hope for any relief from such a local remedy.

Bark, wine, and opium promise much more success in the last stage of the disease. I can say nothing in their favour from my own experience; but from the aid they afford to mercury in other diseases, I conceive they might be made to accompany it with advantage.

Considering the nature of the indirect causes which induce the disease, and the case of a relapse, which has been mentioned, after an interval of near three years as well as the symptoms of slow convalescence, manifested by the pulse, which occurred in the first and seventh cases. I submit it to the consideration of physicians, whether the use of moderate exercise, and the cold bath should not be recommended to prevent a return of the disease in every case, where it has yielded to the power of medicine.

I have great pleasure in adding, that the theory of this disease, which I have delivered, has been adopted by many respectable physicians in Philadelphia, and in other parts of the United States, and that it has led to the practice that has been recommended, particularly to copious blood-letting; in consequence of which, death from a dropsy of the brain is not a more frequent occurrence, than from any other of the acute febrile diseases of our country.

OBSERVATIONS
UPON THE
CAUSE AND CURE
OF
THE GOUT.

VOL. II.

T

OBSERVATIONS, &c.

IN treating upon the gout, I shall deliver a few preliminary propositions.

1. The gout is a disease of the whole system. It affects the ligaments, blood-vessels, stomach, bowels, brain, liver, lymphatics, nerves, muscles, cartilages, bones, and skin.

2. The gout is a primary disease, only of the solids. Chalk-stones, abscesses, dropsical effusions into cavities, and cellular membrane, and eruptions on the skin, are all the effects of a morbid action in the blood vessels. The truth of this proposition has been ably proved by Dr. Cullen in his First Lines.

3. It affects most frequently persons of a sanguineous temperament; but sometimes it affects persons of nervous and phlegmatic temperaments. The idle and luxurious are more subject to it, than the labouring and temperate part of mankind. Women are said to be less subject to it than men. I once believed, and taught this opinion, but I now retract it. From the peculiar delicacy of the female constitution, and from the thin covering they wear on their feet and limbs, the gout is less apt to fall upon those parts than in men, but they exhibit all its other symptoms, perhaps more frequently than men, in other parts of the body. The remote causes of gout moreover to be mentioned presently, act with equal force upon both sexes, and more of them I believe upon men, than upon women.

It generally attacks in those periods of life, and in those countries, and seasons of the year, in which inflammatory diseases are most common. It seldom affects persons before puberty, or in old age, and yet I have heard of its appearing with all its most characteristic symptoms in this city in a child of 6, and in a man

above 80 years of age. Men of active minds are said to be most subject to it, but I think I have seen it as frequently in persons of slender and torpid intellects, as in persons of an opposite character. I have heard of a case of gout in an Indian at Pittsburg, and I have cured a fit of it in an Indian in this city. They had both been intemperate in the use of wine and fermented liquors.

4. It is in one respect a hereditary disease, depending upon the propagation of a similar temperament from father to son. When a predisposition to the gout has been derived from ancestors, less force in exciting causes will induce it than in those habits where this has not been the case. This predisposition sometimes passes by children, and appears in grand-children. There are instances likewise in which it has passed by the males, and appeared only in the females of a family. It even appears in the descendants of families who have been reduced to poverty, but not often where they have been obliged to labour for a subsistence. It generally passes by those children who are born before the gout makes its appearance in a father. It is curious to observe how extensively the predisposition pervades some families. An English gentleman, who had been afflicted with the gout, married a young woman in Philadelphia many years ago, by whom he had one daughter. His wife dying three weeks after the birth of this child, he returned to England, where he married a second wife, by whom he had six children, all of whom except one died with the gout before they attained to the usual age of matrimony in Great Britain. One of them died in her 16th year. Finally the father and grandfather died with the same disease. The daughter whom this afflicted gentleman left in this city, passed her life subject to the gout, and finally died under my care in the year 1789, in the 68th year of her age. She left a family of children, two of whom had the gout. One of them, a lady, has suffered exquisitely from it.

5. The gout is always induced by general predisposing debility.

6. The remote causes of the gout which induce this debility, are indolence, great bodily labour, long protracted bodily exercise, intemperance in eating and in

venery, acid aliments and drinks, strong tea and coffee, public and domestic vexation, the violent, or long continued exercise of the understanding, imagination, and passions in study, business, or pleasure, and lastly, the use of ardent and fermented liquors. The last are absolutely necessary to produce that form of gout which appears in the ligaments and muscles. I assert this, not only from my own observations, but from those of Dr. Cadogan, and Dr. Darwin, who say they never saw a case of gout in the limbs in any person who had not used spirits or wine in a greater or less quantity. Perhaps this may be another reason why women, who drink less of those liquors than men, are so rarely affected with this disease in the extreme parts of their bodies. Wines of all kinds are more disposed to produce this form of gout than spirits. The reason of this must be resolved into the less stimulus in the former, than in the latter liquors. Wine appears to resemble in its action upon the body, the moderate stimulus of miasmata which produce a common remitting fever, or intermitting fever, while spirits resemble that violent action induced by miasmata which passes by the blood-vessels, ligaments, and muscles, and invades at once the liver, bowels, and brain. There is one symptom of the gout in the extremities which seems to be produced exclusively by ardent spirits, and that is a burning in the palms of the hands, and soles of the feet. This is so uniform, that I have sometimes been able to convict my patients of intemperance in the use of spirits, when no other mark of their having taken them in *excess*, appeared in the system.

While I thus ascribe the gout to the use of fermented and distilled liquors, let me repeat that they are not its exclusive causes. Dr. Harle of Newcastle died of the gout, and yet he never tasted wine nor spirits in the whole course of his life. He could not even bear the taste of either of them in a piece of sweet cake. The Brahmins who neither drink wine nor spirits, nor eat animal food, are not exempted from this disease; and Sir James Jay has assured me that he has seen instances of it in persons who lived wholly upon vegetables.

I have enumerated among the remote causes of the

gout, the use of strong tea. I infer its predisposing quality to that disease, from its frequency at Japan, where tea is used in large quantities, and from the gout being more common among that sex in our country who drink the most, and the strongest tea.

7. The exciting causes of the gout are frequently a greater degree, or a sudden application of its remote and predisposing causes. They act upon the accumulated excitability of the system, and by destroying its equilibrium of excitement, and regular order of actions, produce convulsion, or irregular morbid and local excitement. These exciting causes are either of a stimulating, or of a sedative nature. The former are violent exercise of body or mind, night-watching, and even sitting up late at night, a hearty meal, a fit of drunkenness, a few glasses of claret or a draught of cyder, where those liquors have not been habitual to the patient, a sudden paroxysm of joy, anger, or terror, a dislocation of a bone, straining of a joint, particularly of the ankle, undue pressure upon the foot, or leg, from a tight shoe or boot, an irritated corn, and the usual remote causes of fever. The latter exciting causes are sudden inanition from bleeding, purging, vomiting, fasting, cold, a sudden stoppage of moisture on the feet, fear, grief, excess in venery, and debility left upon the system by the crisis of a fever. All these causes act more certainly when they are aided by the additional debility induced upon the system in sleep. It is for this reason that the gout generally makes its first attack in the night, and in a part of the system most remote from the energy of the brain, and most debilitated by exercise, viz. in the great toe, or in some part of the foot. In ascribing a fit of the gout to a cause which is of a sedative nature, the reader will not suppose that I have departed from the simplicity and uniformity of a proposition I have elsewhere delivered, that disease is the effect of stimulus. The abstraction of a natural and habitual impression of any kind, by increasing the force of those which remain, renders the production of morbid and excessive actions in the system as much the effect of preternatural or disproportioned stimulus, as if they were induced by causes that are externally and evidently stimulating. It is thus

in many other of the operations of nature, opposite causes produce the same effects.

8. The gout consists simply in morbid excitement, accompanied with irregular action, or the absence of all action from the force of stimulus. There is nothing specific in the morbid excitement and actions which take place in the gout different from what occur in fevers. It is to be lamented that a kind of metastasis of error has taken place in pathology. The rejection of a specific acrimony as the cause of each disease, has unfortunately been followed by a belief in as many specific actions as there are different forms and grades of disease, and thus perpetuated the evils of our ancient systems of medicine. However varied morbid actions may be by their causes, seats and effects, they are all of the same nature, and the time will probably come when the whole nomenclature of morbid actions will be absorbed in the single name of disease.

I shall now briefly enumerate the symptoms of the gout, as they appear in the ligaments, the blood-vessels, the viscera, the nervous system, the alimentary canal, the lymphatics, the skin, and the bones of the human body, and here we shall find that it is an epitome of all diseases.

1. The ligaments which connect the bones are the seats of what is called a legitimate or true gout. They are affected with pain, swelling and inflammation. The pain is sometimes so acute as to be compared to the gnawing of a dog. We perceive here the sameness of the gout with the rheumatism. Many pages, and indeed whole essays, have been composed by writers to distinguish them, but they are exactly the same disease while the morbid actions are confined to this part of the body. They are, it is true, produced by different remote causes, but this constitutes no more difference in their nature than is produced in a coal of fire, whether it be inflamed by a candle, or by a spark of electricity. The morbid actions which are induced by the usual causes of rheumatism affect, though less frequently, the lungs, the trachea, the head, the bowels, and even the heart as well as the gout. Those actions, moreover, are the means of a fluid being secreted which is changed into calcareous

matter in the joints and other parts of the body, exactly like that which is produced by the gout. They likewise twist and dislocate the bones in common with the gout, in a manner to be described hereafter. The only difference between what are called gouty, and rheumatic actions, consists in their seats and in the degrees of their force. The debility which predisposes to the gout, being greater, and more extensively diffused through the body than the debility which precedes rheumatism, the morbid actions in the former case, pass more readily from external to internal parts, and produce in both more acute and more dangerous effects. A simile derived from the difference in the degrees of action produced in the system by marsh miasmata, made use of upon a former occasion, will serve me again to illustrate this part of our subject. A mild remittent, and a yellow fever, are different grades of the same disease. The former, like the rheumatism, affects the bones chiefly with pain, while the latter, like the gout, affects not only the bones, but the stomach, bowels, brain, nerves, lymphatics, and all the internal parts of the body.

II. In the arterial system the gout produces fever. This fever appears not only in the increased force or frequency of the pulse, but in morbid affections of all the viscera. It puts on all the different grades of fever, from the malignity of the plague, to the mildness of a common intermittent. It has moreover its regular exacerbations and remissions once in every four and twenty hours, and its crisis usually on the fourteenth day, in violent cases. In moderate attacks, it runs on from twenty to forty days in common with the typhus or slow chronic state of fever. It is common for those persons who consider the gout as a specific disease, when it appears in the above forms, to say, that it is complicated with fever; but this is an error, for there can exist but one morbid action in the blood-vessels at once, and the same laws are imposed upon the morbid actions excited in those parts of the body by the remote causes of the gout, as by the common causes of fever. I have seen two instances of this disease appearing in the form of a genuine hectic, and one in which it appeared to yield to lunar influence, in the manner de-

scribed by Dr. Balfour. In the highly inflammatory state of the gout, the sensibility of the blood-vessels far exceeds what is seen in the same state of fever from more common causes. I have known an instance in which a translation of the gouty action to the eye produced such an exquisite degree of sensibility, that the patient was unable to bear the feeble light which was emitted from a few coals of fire in his room, at a time too when the coldness of the weather would have made a large fire agreeable to him. I once attended a lady in this disease in whom the walking of her attendants across the floor of her chamber, and even the touch of a hand upon any part of her body in moving her in bed, excited considerable pain. It is from the extreme sensibility which the gout imparts to the stomach, that the bark is so generally rejected by it. I knew a British officer who had nearly died from taking a spoonful of the infusion of that medicine, while his arterial system was in this state of morbid excitability, from a fit of the gout. It is remarkable that the gout is most disposed to assume a malignant character, during the prevalence of an inflammatory constitution of the atmosphere. This has been long ago remarked by Dr. Huxham. Several instances of it have occurred in this city since the year 1793.

III. The gout affects most of the viscera. In the brain it produces head-ach, vertigo, coma, apoplexy, and palsy. In the lungs it produces pneumonia vera, notha, asthma, hæmoptysis, pulmonary consumption, and a short heaving cough, first described by Dr. Sydenham. In the throat it produces inflammatory angina. In the uterus it produces hæmorrhagia uterina. It affects the kidneys with inflammation, strangury, diabetes, and calculi. The position of the body for weeks or months on the back, by favouring the compression of the kidneys by the bowels, is the principal reason why those parts suffer so much in gouty people. The strangury appears to be produced by the same kind of engorgement or choking of the vessels of the kidneys, which takes place in the small-pox and yellow fever. Four cases of it are described in the 3d volume of the Physical and Literary Essays of Edinburgh, by Dr. David Clark. I have seen one instance of death

in an old man from this cause. The catheter brought no water from his bladder. The late Mr. John Penn, formerly governor of Pennsylvania, I have been informed by one of his physicians, died from a similar affection in his kidneys from gout. The catheter was as ineffectual in giving him relief, as it was in the case of my patient. The neck of the bladder sometimes becomes the seat of the gout. It discovers itself by spasm, and a suppression of urine in some cases, and occasionally by a habitual discharge of mucous through the urethra. This disease has been called, by Lieutaud, "a catarrh of the bladder." Dr. Stoll describes it and calls it "hæmorrhoids of the bladder." But of all the viscera, the liver suffers most from the gout. It produces in it inflammation, suppuration, melæna, schirrus, gall-stones, jaundice, and a habitual increased secretion and excretion of bile. These affections of the liver appear most frequently in southern countries, and in female habits. They are substitutes for a gout in the ligaments, and in the extremities of the body. They appear likewise in drunkards from ardent spirits. It would seem that certain stimuli act specifically upon the liver, probably for the wise purpose of discharging such parts of the blood from the body, as are vitiated by the rapidity of its circulation. I shall, in another place,* take notice of the action of marsh miasmata upon the livers of men and beasts. It has been observed that hogs that live near brewhouses, and feed upon the fermented grains of barley, always discover enlarged or diseased livers. But a determination of the blood to the liver, and an increased action of its vessels, are produced by other causes than marsh miasmata, and fermented and distilled liquors. They appear in the fever which accompanies madness and the malignant sore throat, also in contusions of the brain, and in the excited state of the blood-vessels which is produced by anger and exercise. I have found an attention to these facts useful in prescribing for diseases of the liver, inasmuch as they have led me from considering them as idiopathic affections, but as the effects only of morbid actions excited in other parts of the body.

IV. The gout sometimes affects the arterial and nervous systems *jointly*, producing in the brain, coma, vertigo, apoplexy, palsy, loss of memory, and madness, and in the *nerves*, hysteria, hypochondriasis and syncope. It is common to say the gout counterfeits all these diseases. But this is an inaccurate mode of speaking. All those diseases have but one cause, and they are exactly the same, however different the stimulus may be, from which they are derived. Sometimes the gout affects the brain and nerves exclusively, without producing the least morbid action in the blood-vessels. I once attended a gentleman from Barbadoes who suffered from this affection of his brain and nerves, the most intolerable depression of spirits. It yielded to large doses of wine, but his relief was perfect, and more durable, when a pain was excited by nature or art, in his hands or feet.

The muscles are sometimes affected by the gout with spasm, with general and partial convulsions, and lastly with great pain. Dr. Stoll describes a case of opisthotonos from it. The angina pectoras, or a sudden inability to breath after climbing a hill, or a pair of stairs, and after a long walk, is sometimes a symptom of the gout. There is a pain which suddenly pervades the head, breast, and limbs, which resembles an electric shock. I have known two instances of it in gouty patients, and have taken the liberty of calling it the "aura arthritica." But the pain which affects the muscles is often of a more permanent nature. It is felt with most severity in the calves of the legs. Sometimes it affects the muscles of the head, breast, and limbs, exciting in them large and distressing swellings. But further; the gout in some cases seizes upon the tendons, and twists them in such a manner as to dislocate bones in the hands and feet. It even affects the cartilages. Of this I once saw an instance in colonel Adams of the state of Maryland. The external parts of both his ears were so much inflamed in a fit of the gout, that he was unable to lie on either of his sides.

V. The gout affects the alimentary canal, from the stomach to its termination in the rectum. Flatulency, sickness, acidity, indigestion, pain, or vomiting, usually ushers in a fit of the disease. The sick head-ach, also

dyspepsia, with all its train of distressing evils, are frequently the effects of gout concentrated in the stomach. I have seen a case in which the gout, by retreating to this viscus, produced the same burning sensation which is felt in the yellow fever. The patient who was the subject of this symptom died two days afterwards with a black vomiting. It was Mr. Paterson, formerly collector of the port of Philadelphia, under the British government. I was not surprised at these two uncommon symptoms in the gout, for I had long been familiar with its disposition to affect the biliary secretion, and the actions of the stomach. The colic and dysentery are often produced by the gout in the bowels. In the southern states of America, it sometimes produces a chronic diarrhœa, which is known in some places by the name of the "downward consumption." The piles are a common symptom of gout, and were they pour forth blood occasionally render it a harmless disease. I have known an instance in which a gouty pain in the rectum produced involuntary stools in a gentlemen in this city, and I have heard from a southern gentleman, who had been afflicted with gouty symptoms, that a similar pain was excited in the same part to such a degree, whenever he went into a crowded room, lighted by candles, as to oblige him to leave it. In considering the effects of the gout upon this part, I am led to take notice of a troublesome itching in the anus which has been described by Dr. Lettsom, and justly attributed by him to this disease.* I have known several cases of it. They always occurred in gouty habits. A distressing collection of air in the rectum, which renders frequent retirement from company necessary to discharge it, is likewise a symptom of gout. It is accompanied with frequent, and small, but hard stools.

Of the above morbid affections of the nerves, stomach, and bowels, the hysteria, the sick head-ach, and the colic, appear much oftener in women than in men. I have said that dyspepsia is a symptom of gout. Out of more than 500 persons who were the patients of the Liverpool infirmary and dispensary, in one-year, Dr. Currie informs us, "a great majority were females."†

* Medical Memoirs, vol III.

† Medical Reports on the Effects of Hot and Cold Water, p. 215.

VI. The gout affects the glands and lymphatics. It produced a salivation of a profuse nature in major Pearce Butler, which continued for two days. It produced a bubo in the groin in a citizen of Philadelphia. He had never been infected with the venereal disease, of course no suspicion was entertained by me of its being derived from that cause. I knew a lady who had periodical swellings in her breasts, at the same season of the year in which she had before been accustomed to have a regular fit of the gout. The scrofula and all the forms of dropsy are the effects in many cases of the disposition of the gout to attack the lymphatic system. There is a large hard swelling without pain, of one, or both the legs and thighs, which has been called a dropsy, but is very different from the common disease of that name. It comes on, and goes off suddenly. It has lately been called in England the *dumb* gout. In the spring of 1798 I attended colonel Innes, of Virginia, in consultation with my Edinburgh friend and fellow-student, Dr. Walter Jones, of the same state. The colonel had large anasarcous swellings in his thighs and legs, which we had reason to believe were the effects of an indolent gout. We made several punctures in his feet and ancles, and thereby discharged a large quantity of water from his legs and thighs. A day or two afterwards his ancles exhibited in pain and inflammation, the usual form of gout in those parts. In the year 1794 I attended Mrs. Lloyd Jones, who had a swelling of the same kind in her foot and leg. Her constitution, habits, and the sober manners of her ancestors, gave me no reason to suspect it to arise from the usual remote causes of gout. She was feverish, and her pulse was tense. I drew ten ounces of blood from her, and gave her a purge. The swelling subsided, but it was succeeded by an acute rheumatic pain in the part, which was cured in a few days. I mention these facts as an additional proof of the sameness of the gout and rheumatism, and to show that the vessels in a simple disease, as well as in malignant fevers, are often oppressed beyond that point in which they emit the sensation of pain.

Under this head I shall include an account of the mucous discharge from the urethra, which sometimes

takes places in an attack of the gout, and which has ignorantly been ascribed to venereal gonorrhœa. There is a description of this symptom of the gout in the 34 volume of the Physical and Literary Essays of Edinburgh, by Dr. Clark. It was first taken notice of by Sauvages by the name of "gonorrhœa podagrica," in a work entitled *Pathologia Methodica*, and afterwards by Dr. Whytt. Dr. Plaigne saw an instance of this symptom alternating with a pain in the great toe, and which was removed by a blister to that part of the body. It occurs most frequently in old people. I have known three instances of it in this city. In the visits which the gout pays to the genitals, it sometimes excites great pain in the testicles. Dr. Whytt mentions three cases of this kind. One of them was attended with a troublesome itching of the scrotum. I have seen one case in which the testicles were affected with great pain, and the penis with an obstinate priapism. They succeeded a sudden translation of the gout from the bowels.

From the occasional disposition of the gout to produce a mucous discharge from the urethra in men, it is easy to conceive that it is the frequent cause of the fluor albus in women, for in them, the gout which is restrained from the feet, by a cause formerly mentioned, is driven to other parts, and particularly to that part which, from its offices, is more disposed to invite disease to it, than any other. The fluor albus sometimes occurs in females, apparently of the most robust habits. In such persons, more especially if they have been descended from gouty ancestors, and have led indolent and luxurious lives, there can be no doubt but the disease is derived from the gout, and should be treated with remedies which act not only upon the affected part, but the whole system. It is known by being accompanied with pains in the limbs, and by being worst when in bed. An itching similar to that I formerly mentioned in the anus, sometimes occurs in the vagina of women. Dr. Lettsom has described it. In all the cases I have known of it, I believe it was derived from the usual causes of the gout.

VII. There are many records in the annals of medicine of the gout affecting the skin. The erysipelas, gangrene,

and petechiæ are its acute, and tetters, and running sores are its usual chronic forms when it appears in this part of the body. I attended a patient with the late Dr. Hutchinson, in whom the whole calf of one leg was destroyed by a mortification which succeeded the gout. Dr. Alexander, of Baltimore, informed me that petechiæ were among the last symptoms of this disease in the Rev. Mr. Oliver, who died in the town of Baltimore, about two years ago. In the disposition of the gout to attack external parts, it sometimes affects the eyes and ears with the most acute and distressing inflammation and pain. I hesitate the less in ascribing them both to the gout, because they not only occur in gouty habits, but because they now and then effuse a calcareous matter of the same nature with that which is found in the ligaments of the joints.

VIII. Even the bones are not exempted from the ravages of this disease. I have before mentioned that the bones of the hands and feet are sometimes dislocated by it. I have heard of an instance in which it dislocated the thigh bone. It probably produced this effect by the effusion of that part of the blood which constitutes chalk-stones, or by an excrescence of flesh in the cavity of the joint. Two instances have occurred in this city of its dislodging the teeth, after having produced the most distressing pains in the jaws. The long protracted, and acute pain in the face, which has been so accurately described by Dr. Fothergill, probably arises wholly from the gout acting upon the bones of the part affected.

I have more than once hinted at the sameness of some of the states of the gout, and the yellow fever. Who can compare the symptoms and seats of both diseases, and not admit the unity of the remote and immediate causes of fever?

Thus I have enumerated proofs of the gout being a disease of the *whole* system. I have only to add under this proposition, that it affects different parts of the body in different people, according to the nature of their congenial or acquired predispositions, and that it often passes from one part of the body to another in the twinkling of an eye.

The morbid excitement, and actions of the gout, when

seated in the ligaments, the blood-vessels, and viscera, and left to themselves, produce effects different in their nature, according to the parts in which they take place. In the viscera they produce congestions composed of all the component parts of the blood. From the blood-vessels which terminate in hollow cavities and in cellular membrane, they produce those effusions of serum which compose dropsies. From the same vessels proceed those effusions which produce on the skin erysipelas, tetters, and all the different kinds of eruptions. In the ligaments they produce an effusion of coagulable lymph, which by stagnation is changed into what are called chalk-stones. In the urinary organs they produce an effusion of particles of coagulable lymph or red blood, which, under certain circumstances, are changed into sand, gravel, and stone. All these observations are liable to some exceptions. There are instances in which chalk-stones have been found in the lungs, mouth, on the eye-lids, and in the passages of the ears, and a preternatural flux of water and blood has taken place from the kidneys. Pus has likewise been formed in the joints, and air has been found in the cavity of the belly, instead of water.

Sometimes the gout is said to combine with the fevers which arise from cold and miasmata. We are not to suppose from this circumstance, that the system is under a twofold stimulus. By no means. The symptoms which are ascribed to the gout, are the effects of morbid excitement, excited by the cold, or miasmata acting upon parts previously debilitated by the usual remote causes of that disease. A bilious constitution of the air so often excites the peculiar symptoms of gout in persons predisposed to it, that it has sometimes been said to be epidemic. This was the case, Dr. Stoll says, in Vienna, in the years 1782 and 1784. The same mixture of gouty and bilious symptoms was observed by Dr. Hillary, in the fevers of Barbadoes. It is because gouty people have some parts of their bodies previously debilitated, that they often escape epidemic diseases. Those weak parts invite, and fix disease to one or two places, and thus prevent its being diffused throughout the whole system. Of this Sir John Pringle relates a striking instance. While

the British army was in the north of Scotland, in the year 1746, the weather became suddenly very cold, in consequence of which catarrhs become general among the soldiers, while many of the officers were affected only with gout. Here the obstructed perspiration which fell upon the breast in the soldiers, was translated to parts previously debilitated in the officers, and there excited the symptoms of what is called another disease.

From a review of the symptoms of the gout, the impropriety of distinguishing it from its various seats, by specific names, must be obvious to the reader. As well might we talk of a yellow fever in the brain, in the nerves, or in the groin, when its symptoms affect those parts, as talk of *misplaced* or *retrocedent* gout. The great toe, and the joints of the hands and feet, are no more its exclusive seats, than the "stomach is the throne of the yellow fever." In short, the gout may be compared to a monarch whose empire is unlimited. The whole body crouches before it.

It has been said as a reflection upon our profession, that physicians are always changing their opinions respecting chronic diseases. For a long while they were all classed under the heads of nervous, or bilious. These names for many years afforded a sanctuary for the protection of fraud and error in medicine. They have happily yielded of late years to the name of gout. If we mean by this disease a primary affection of the joints, we have gained nothing by assuming that name; but if we mean by it a disease which consists simply of morbid excitement, invited by debility, and disposed to invade every part of the body, we conform our ideas to facts, and thus simplify theory and practice in chronic diseases.

I proceed now to treat of the METHOD OF CURE.

Let not the reader startle when I mention curing the gout. It is not a sacred disease. There will be no profanity in handling it freely. It has been cured often, and I hope to deliver such directions under this head, as will reduce it as much under the power of medicine, as a pleurisy or an intermitting fever. Let not superstition say here, that the gout is the just punishment of folly and vice, and that the justice of Heaven would be defeated by

curing it. The venereal disease is more egregiously the effect of vice than the gout, and yet Heaven has kindly directed human reason to the discovery of a remedy which effectually eradicates it from the constitution. This opinion of the gout being a curable disease, is as humane as it is just. It is calculated to prompt to early application for medical aid, and to prevent that despair of relief which has contributed so much to its duration, and mortality.

But does not the gout prevent other diseases, and is it not improper upon this account to cure it? I answer, that it prevents other diseases, as the daily use of drams prevents the intermitting fever. In doing this, it brings on a hundred more incurable morbid affections. The yellow fever carried off many chronic diseases in the year 1793, and yet who would wish for, or admit such a remedy for a similar purpose? The practice of encouraging, and inviting what has been called a "friendly fit" of the gout as a cure for other diseases, resembles the practice of school boys who swallow the stones of cherries to assist their stomachs in digesting that delicate fruit. It is no more necessary to produce the gout in the feet, in order to cure it, than it is to wait for, or encourage abscesses or natural hæmorrhages, to cure a fever. The practice originated at a time when morbid matter was supposed to be the cause of the gout, but it has unfortunately continued under the influence of theories which have placed the seat of the disease in the solids.

The remedies for the gout naturally divide themselves into the following heads.

I. Such as are proper in its approaching, or forming state,

II. Such as are proper in *violent* morbid action in the blood-vessels and viscera.

III. Such as are proper in a *feeble* morbid action in the same parts of the body.

IV. Such as are proper to relieve certain local symptoms which are not accompanied by general morbid action.* And

V. Such as are proper to prevent its recurrence, or, in other words, to eradicate it from the system.

I. The symptoms of an approaching fit of the gout are

great languor and dulness of body and mind, dozing, giddiness, wakefulness, or sleep disturbed by vivid dreams, a dryness, and sometimes a coldness, numbness, and prickling, in the feet and legs, a disappearance of pimples in the face, occasional chills, acidity and flatulency in the stomach, with an increased, a weak, or a defect of appetite. The chemists have discovered another symptom of an approaching fit of the gout, and that is, the presence of the phosphoric acid in the urine. The very sweats they say of gouty patients tinge the syrup of violets of a red colour from the predominance of this acid in them. The symptoms which have been mentioned are not universal, but more or less of them usher in nearly every fit of the gout. The reader will see at once their sameness with the premonitory symptoms of fever from cold and miasmata, and assent, from this proof in addition to others formerly mentioned, to the propriety of considering a fit of the gout, as a paroxysm of fever.

The system, during the existence of these symptoms, is in a state of morbid depression. The disease is as yet unformed, and may easily be prevented by the loss of a few ounces of blood, or, if this remedy be objected to, by a gentle dose of physic, and afterwards by bathing the feet in warm water, by a few drops of the spirits of harts-horn in a little sage or chamomile tea, by a draught of wine whey, or a common dose of liquid laudanum, and, according to a late Portuguese physician, by taking a few doses of bark.

It is worthy of notice, that if these remedies are omitted, all the premonitory symptoms that have been mentioned disappear as soon as the arthritic fever is formed, just as lassitude and chilliness yield to a paroxysm of fever from other causes.

II. Of the remedies that are proper in cases of great morbid action in the blood vessels and viscera.

I shall begin this head by repudiating the notion of a specific cure for the gout existing in any single article of the *materia medica*. Every attempt to cure it by elixirs, diet-drinks, pills or boluses, which were intended to act singly on the system, has been as unsuccessful as the at-

tempts to cure the whooping cough by spells, or tricks of legerdemain.

The first remedy that I shall mention for reducing great morbid action in the blood vessels and viscera is BLOOD-LETTING. I was first taught the safety of this remedy in the gout by reading the works of Dr. Lister, near forty years ago, and I have used it ever since with great advantage. It has the sanction of Dr. Hoffman, Dr. Cullen, and many others of the first names in medicine in its favour.

The usual objections to bleeding as a remedy, have been urged with more success in the gout than in any other disease. It has been forbidden, because the gout is said to be a disease of debility. This is an error. Debility is not a disease. It is only its predisposing cause. Disease is preternatural strength in the state of the system now under consideration, occasioned by the abstraction of excitement from one part, and the accumulation of it in another part of the body. Every argument in favour of bleeding in a pleurisy applies in the present instance, for they both depend upon the same kind of morbid action in the blood vessels. Bleeding acts moreover alike in both cases by abstracting the excess of excitement from the blood vessels, and restoring its natural and healthy equality to every part of the system.

It has been further said, that bleeding disposes to more frequent returns of the gout. This objection to the lancet has been urged by Dr. Sydenham, who was misled in his opinion of it, by his theory of the disease being the offspring of morbid matter. The assertion is unfounded, for bleeding in a fit of the gout has no such effect, provided the remedies to be mentioned hereafter are used to prevent it. But a fit of the gout is not singular in its disposition to recur after being once cured. The rheumatism, the pleurisy, and the intermitting fever are all equally disposed to return when persons are exposed to their remote and exciting causes, and yet we do not upon this account consider them as incurable diseases, nor do we abstain from the usual remedies which cure them.

The inflammatory or violent state of the gout is said most commonly to affect the limbs. But this is far from

being the case. It frequently makes its first attack upon the head, lungs, kidneys, stomach, and bowels. The remedies for expelling it from the stomach and bowels are generally of a stimulating nature. They are as improper in full habits, and in the recent state of the disease, as cordials are to drive the small-pox from the vitals to the skin. Hundreds have been destroyed by them. Bleeding in these cases affords the same speedy and certain relief that it does in removing pain from the stomach and bowels in the first stage of the yellow fever. Colonel Miles owes his life to the loss of 60-ounces of blood in an attack of the gout in his bowels, in the winter of 1795, and major Butler derived the same benefit from the loss of near 30 ounces, in an attack of the gout in his stomach in the spring of 1798.

I could add many more instances of the efficacy of the lancet in the gout when it affects the viscera, from my own experience, but I prefer mentioning one only from sir John Floyer, which is more striking than any I have met with in its favour. He tells us, sir Henry Coningsby was much disposed to the palsy from the gout when he was 30 years old. By frequent bleedings, and the use of the cold bath, he recovered, and lived to be 88. During his old age, he was bled every three months.

I have said, in the history of the symptoms of the gout, that it sometimes appeared in the form of a hectic fever. I have prescribed occasional bleedings in a case of this kind accompanied with a tense pulse, with the happiest effects. It confined the disease for several years wholly to the blood vessels, and it bid fair in time to eradicate it from the system.

The state of the pulse, as described in another place,* should govern the use of the lancet in this disease. Bleeding is required as much in its depressed, as in its full and chorded state. Colonel Miles's pulse, at the time he suffered from the gout in his bowels, was scarcely perceptible. It did not rise till after a second or third bleeding.

Some advantage may be derived from examining the blood. I have once known it to be dissolved; but for the

* Defence of Blood-letting, vol. IV.

most part I have observed, it with Dr. Lister, to be covered with the buffy coat of common inflammation.

The arguments made use of in favour of bleeding in the diseases of old people in a former volume, apply with equal force to its use in the gout. The inflammatory state of this disease frequently occurs in the decline of life, and bleeding is as much indicated in such cases as in any other inflammatory fever. The late Dr. Chovet died with an inflammation in his liver from gout, in the 86th year of his age. He was twice bled, and his blood each time was covered with a buffy coat.

Where the gout affects the head with obstinate pain, and appears to be seated in the muscles, cupping and leeches give great relief. This mode of bleeding should be trusted in those cases only in which the morbid action is confined chiefly to the head, and appears in a feeble state in the rest of the arterial system.

The advantages of bleeding in the gout, when performed under all the circumstances that have been mentioned, are as follow :

1. It removes or lessens pain.

2. It prevents those congestions and effusions which produce apoplexy, palsy, pneumonia notha, calculi in the kidneys and bladder, and chalk-stones in the hands and feet. The gravel and stone are nine times in ten, I believe, the effects of an effusion of lymph or blood from previous morbid action in the kidneys. If this disease were narrowly watched, and cured as often as it occurs, by the loss of blood, we should have but little gravel or stone among gouty people. A citizen of Philadelphia died a few years ago, in the 96th year of his age, who had been subject to the strangury the greatest part of his life. His only remedy for it was bleeding. He lived free from the gravel and stone, and died, or rather appeared to fall asleep in death; from old age. Dr. Haller mentions a similar case in his *Bibliotheca Medicinæ*, in which bleeding had the same happy effects.

3. It prevents the system from wearing itself down by fruitless pain and sickness, and thereby inducing a predisposition to frequent returns of the disease.

4. It shortens the duration of a fit of gout, by throwing

it, not into the feet, but out of the system, and thus prevent a patient's lying upon his back for two or three months with a writhing face, scolding a wife and family of children, and sometimes cursing every servant that comes near enough to endanger the touch of an inflamed limb. Besides preventing all this parade of pain and peevishness; it frequently, when assisted with other remedies to be mentioned presently, restores a man to his business and society in two or three days: a circumstance this of great importance in the public as well as private pursuits of men; for who has not read of the most interesting affairs of nations being neglected or protracted, by the principal agents in them being suddenly confined to their beds, or chairs, for weeks or months, by a fit of the gout?

2. A second remedy in the state of the gout which has been mentioned, is *purgings*. Sulphur is generally preferred for this purpose, but castor oil, cream of tartar, sena, jalap, rhubarb, and calomel, may all be used with equal safety and advantage. The stomach and habits of the patient should determine the choice of a suitable purge in every case. Salts are generally offensive to the stomach. They once brought on a fit of the gout in Dr. Brown.

3. *Vomits* may be given in all those cases where bleeding is objected to, or where the pulse is only moderately active. Mr. Small, in an excellent paper upon the gout, in the 6th volume of the Medical Observations and Inquiries, p. 205, containing the history of his own case, tells us that he always took a vomit upon the first attack of the gout, and that it never failed of relieving all its symptoms. The matter discharged by this vomit indicated a morbid state of the liver, for it was always a dark greenish bile, which was insoluble in water. A British lieutenant, whose misfortunes reduced him to the necessity of accepting a bed in the poor-house of this city, informed the late Dr. Steuben that he had once been much afflicted with the gout, and that he had upon many occasions strangled a fit of it by the early use of an emetic. Dr. Pye adds his testimony to those which have been given in favour of vomits, and says further, that

they do most service when they discharge an acid humour from the stomach. They appear to act in part by equalizing the divided excitement of the system, and in part by discharging the contents of the gall-bladder and stomach, vitiated by the previous debility of those organs. Care should be taken not to exhibit this remedy where the gout attacks the stomach with symptoms of inflammation, or where it has a tendency to fix itself upon the brain.

4. *Nitre* may be given with advantage in cases of inflammatory action, where the stomach is not affected.

5. A fifth remedy is *cool or cold air*. This is as safe and as useful in the gout as in any other inflammatory state of fever. The affected limbs should be kept out of bed *uncovered*. In this way Mr. Small says he moderated the pains of the gout in his hands and feet.* I have directed the same practice with great comfort, as well as advantage to my patients. Even cold water has been applied with good effects to a limb inflamed by the gout. Mr. Blair M'Clenachan taught me the safety and benefit of this remedy, by using it upon himself without the advice of a physician. It instantly removed his pain, nor was the gout translated by it to any other part of his body. It was removed in the same manner, Dr. Heberden tells us, by the celebrated Dr. Harvey, from his own feet. Dr. Kinlake has lately published a treatise in favour of the application of cold water to the limbs of gouty patients. To be effectual, he says it should be applied by means of wet cloths for eight and forty hours, and that frictions should be used afterwards to the parts affected. This practice has had its advocates and its opponents. Where no internal predisposition exists from debility, it is I believe as safe as in a common rheumatism, but I would by no means advise it to persons who had been previously affected with gout in the stomach, bowels, breast or brain. Perhaps it would be best in most cases to prefer cool, or cold air, to cold water. The safety and advantages of both the modes of applying cold to the affected limbs which have been mentioned, show the impropriety

* Medical Observations and Inquiries, vol. VI. p. 201.

ty of the common practice of wrapping them in flannel.

6. *Diluting liquors*, such as are prescribed in common inflammatory fevers, should be given in such quantities as to dispose to a gentle perspiration.

7. *Abstinence from wine, spirits, and malt liquors*, also from such aliments as afford much nourishment or stimulus, should be carefully enjoined. Sago, panada, tapioca, diluted milk with bread, and the pulp of apples, summer fruits tea, coffee weak chocolate, and bread soaked in chicken water or beef tea, should constitute the principal diet of patients in this state of the gout.

8. *Blisters* are an invaluable remedy in this disease, when used at a proper time, that is, after the reduction of the morbid actions in the system by evacuations. They should be applied to the joints of the feet and wrists in general gout, and to the neck and sides, when it attacks the head or breast. A strangury from the gout is no objection to their use. So far from increasing this complaint, Dr. Clark and Dr. Whytt inform us, that they remove it.* But the principal advantage of blisters is derived from their collecting and concentrating scattered and painful sensations, and conveying them out of the system, and thus becoming excellent substitutes for a tedious fit of the gout.

9. *Fear and terror* have in some instances cured a paroxysm of this disease. A captain of a British ship of war, who had been confined for several weeks to his cabin by a severe fit of the gout in his feet, was suddenly cured by hearing the cry of fire on board his ship. This fact was communicated to me by a gentleman who was a witness of it. Many similar cases are upon record in books of medicine. I shall in another place insert an account of one in which the cure effected by a fright, eradicated the disease from the system so completely, as afterwards to prevent its return.

Thus have I enumerated the remedies which are proper in the gout when it affects the blood-vessels and viscera with great morbid action. Most of those remedies are alike proper when the morbid actions are seated in the muscular fibres, whether of the bowels or limbs, and whe-

* Physical and Literary Essays, vol. III. p. 469.

ther they produce local pain, or general convulsion, provided they are of a violent nature.

There are some remedies under this head of a doubtful nature, on which I shall make a few observations.

Sweating has been recommended in this state of the gout. All the objections to it in preference to other modes of depletion mentioned in another place,* apply against its use in the inflammatory state of the gout. It is not only less safe than bleeding, purging, and abstinence, but it is often an impracticable remedy. The only sudorific medicine to be trusted in this state of the disease is the Seneka snake-root. It promotes all the secretions and excretions, and exerts but a feeble stimulus upon the arterial system.

Many different preparations of *opium* have been advised in this state of the gout. They are all hurtful if given before the morbid action of the system is nearly reduced. It should then be given in small doses accommodated to the excitability of the system.

Applications of various kinds to the affected limbs have been used in a fit of the gout, and some of them with success. The late Dr. Chalmers of South-Carolina used to meet the pain of the gout as soon as it fixed in any of his limbs, with a blister, and generally removed it by that means in two or three days. I have imitated this practice in several cases, and always with success, nor have ever seen the gout thrown upon any of the viscera by means of this remedy. Caustics have sometimes been applied to gouty limbs with advantage. The moxa described and used by Sir William Temple, which is nothing but culinary fire, has often not only given relief to a pained limb, but carried off a fit of the gout in a few hours. These powerful applications may be used with equal advantage in those cases in which the gout by falling upon the head produces coma, or symptoms of apoplexy. A large caustic to the neck roused Mr. John M. Nesbit from a coma in which he had lain for three days, and thereby appeared to save his life. Blisters and cataplasms of mustard, had been previously used to different parts of his body, but without the least effect. In cases

* Defence of Blood-letting.

of moderate pain, where a blister has been objected to, I have seen a cabbage leaf afford considerable relief. It produces a moisture upon the part affected, without exciting any pain. An old sea captain taught me to apply molasses to a limb inflamed or pained by the gout. I have frequently advised it, and generally with advantage. All volatile and stimulating liniments are improper, for they not only endanger a translation of the morbid excitement to the viscera, but where they have not this effect, they increase the pain and inflammation of the part affected.

The sooner the patient exercises his lower limbs by walking after a fit of the gout the better. "I made it a constant rule (says Mr. Small) to walk abroad as soon as the inflammatory state of the gout was past, and though by so doing, I often suffered great pain I am well convinced that the free use I now enjoy of my limbs is chiefly owing to my determined perseverance in the use of that exercise; nor am I less persuaded that nine in ten of gouty cripples owe their lameness more to indolence and fear of pain, than to the genuine effects of the gout."* Sir William Temple confirms the propriety of Mr. Small's opinion and practice, by an account of an old man who obviated a fit of the gout as often as he felt it coming in his feet, by walking in the open air, and afterwards by going into a warm bed, and having the parts well rubbed where the pain began. "By following this course (he says) he was never laid up with the gout, and before his death recommended the same course to his son if ever he should fall into that accident." Under a conviction of the safety of this practice the same author concludes the history of his own case in the following words: "I favoured it [viz. the swelling in my feet] all this while more than I needed, upon the common opinion, that walking too much might draw down the humour, which I have since had reason to conclude is a great mistake, and that if I had walked as much as I could from the first day the pain left me, the swelling might have left me too in a much less time."†

* Medical Observations and Inquiries, vol. vi. p. 220.

† Essay upon the Cure of the Gout by moxa, vol. i. folio edition, p. 141 and 143.

III. I come now to mention the remedies which are proper in that state of the gout in which a *feeble* morbid action takes place in the blood-vessels and viscera.

I shall begin this head, by remarking, that this state of the gout is often created, like the typhus state of fever, by the neglect, or too scanty use of evacuations in its first stage. When the prejudices which now prevent the adoption of those remedies in their proper time, are removed, we shall hear but little of the low state of the arthritic fever, nor of the numerous diseases from obstruction which are produced by the blood-vessels disorganizing the viscera, by repeated and violent attacks of the disease.

To determine the character of a paroxysm of gout and the remedies proper to relieve it, the climate, the season of the year, the constitution of the atmosphere, and the nature of the prevailing epidemic, should be carefully attended to by a physician. But his principal dependence should be placed upon the state of the pulse. If it do not discover the marks which indicate bleeding formerly referred to, but is weak, quick, and soft, the remedies should be such as are calculated to produce a more vigorous and equable action in the blood-vessels and viscera. They are,

1. *Opium*. It should at first be given in small doses, and afterwards increased, as circumstances may require.

2. *Madeira* or *Sherry wine* alone, or diluted with water, or in the form of whey, or rendered more cordial by having any agreeable spice infused in it. It may be given cold or warm, according to the state of the patient or the state of his stomach. If this medicine be rejected in all the above forms,

3. *Porter* should be given. It is often retained when no other liquor will lie upon the stomach. I think I once saved the life of Mr. Nesbit by this medicine. It checked a vomiting, from the gout, which seemed to be the last symptom of his departing life. If porter fail of giving relief,

4. *Ardent spirits* should be given, either alone, or in the form of grog or toddy. Cases have occurred in which a pint of brandy has been taken in the course of an hour with advantage. Great benefit has sometimes been found

from Dr. Warner's tincture, in this state of the gout. As these observations may fall into the hands of persons who may not have access to Dr. Warner's book, I shall here insert the receipt for preparing it.

Of raisins, sliced and stoned, half a pound.

Rhubarb, once ounce.

Sena, two drachms.

Coriander and fennel seeds, of each one drachm.

Cochineal, saffron, and liquorice root, each half a drachm.

Infuse them for ten days in a quart of French brandy, then strain it and add a pint more of brandy to the ingredients, afterwards strain it, and mix both tinctures together. Four table spoons full of this cordial are to be taken every hour, mixed with an equal quantity of water, until relief be obtained.

Ten drops of laudanum may be added to each dose in those cases in which the cordial does not produce its intended effects, in two or three hours. If all the different forms of ardent spirits which have been mentioned fail of giving relief,

5. From 30 drops to a tea spoon full of *æther* should be given in any agreeable vehicle. Also,

6. *Volatile alkali*. From five to ten grains of this medicine should be given every two hours.

7. *Aromatic substances*, such as alspice, ginger, Virginia snake-root, cloves, and mace in the form of teas have all been useful in this state of the gout. Dr. Heberden prefers them to wine and spirits, from their being more permanent in their effects.

All these remedies are indicated in a more especial manner when the gout affects the stomach. They are likewise proper when it affects the bowels. The laudanum in this case should be given by way of clyster. After the vomiting was checked in Mr. Nesbit by means of porter, he was afflicted with a dull and distressing pain in his bowels, which was finally removed by two anodyne clysters injected daily for two or three weeks.

8. Where the gout produces spasmodic or convulsive motions, the *oil of amber* may be given with advantage. I once saw it remove for a while a convulsive cough from the gout.

9. In cases where the stomach will bear the *bark*, it should be given in large and frequent doses. It does the same service in this state of gout, that it does in the slow, or low states of fever from any other cause. Where the gout appears in the form of an intermittent, the bark affords the same relief that it does in the same disease from autumnal exhalations. Mr. Small found great benefit from it after discharging the contents of his stomach and bowels by a dose of tartar emetic. "I do not call (says this gentleman) a fit of the gout a paroxysm, for there are several paroxysms in the fit, each of which is ushered in with a rigour, sickness at stomach, and subsequent heat. In this the gout bears a resemblance to an irregular intermittent, at least to a remitting fever, and hence perhaps the efficacy of the bark in removing the gout."*

10. The *warm bath* is a powerful remedy in exciting a regular and healthy action in the sanguiferous system. Where the patient is too weak to be taken out of bed, and put into a bathing tub, his limbs and body should be wrapped in flannels dipped in warm water. In case of a failure of all the above remedies,

11. A *salivation* should be excited as speedily as possible, by means of mercury. Dr. Cheyne commends it in high terms. I have once used it with success. The mercury, when used in this way, brings into action an immense mass of latent excitement, and afterwards diffuses it equally through every part of the body.

12. Besides these internal remedies, frictions with brandy, and volatile liniment, should be used to the stomach and bowels. Blisters should be applied to parts in which congestion or pain is seated, and stimulating cataplasms should be applied to the lower limbs. The flour of mustard has been justly preferred for this purpose. It should be applied to the upper part of the foot.

The reader will perceive, in the account I have given of the remedies proper in the feeble state of chronic fever, that they are the same which are used in the common typhus, or what is called nervous fever. There is no reason why they should not be the same, for the supposed two morbid states of the system are but one disease.

* Medical Observations and Inquiries, vol. vi. p. 220.

It is agreeable in medical researches to be under the direction of principles. They render unnecessary, in many instances, the slow and expensive operations of experience, and thus multiply knowledge, by lessening labour. The science of navigation has rested upon this basis, since the discovery of the loadstone. A mariner who has navigated a ship to one distant port, is capable of conducting her to every port on the globe. In like manner, the physician who can cure one disease by a knowledge of its principles, may by the same means cure all the diseases of the human body, for their causes are the same. Judgment is required only in accommodating the force of remedies to the force of each disease. The difference in diseases which arises from their seats, from age, sex, habit, season, and climate, may be known in a short time, and is within the compass of very moderate talents.

IV. Were I to enumerate all the local symptoms of gout which occur without fever, and the remedies that are proper to relieve them, I should be led into a tedious digression. The reader must consult practical books for an account of them. I shall only mention the remedies for a few of them.

The theory of the gout which has been delivered, will enable us to understand the reason why a disease which properly belongs to the whole system should at any time be accompanied only with local morbid affection. The whole body is a unit, and hence morbid impressions which are resisted by sound parts are propagated to such as are weak, where they excite those morbid actions we call disease.

The *head-ach* is a distressing symptom of the gout. It yields to depleting or tonic remedies, according to the degree of morbid action which accompanies it. I have heard an instance of an old man, who was cured of an obstinate head-ach by throwing aside his nightcap, and sleeping with his bare head exposed to the night air. The disease in this case was probably attended with great morbid action. In this state of the vessels of the brain, cupping, cold applications to the head, purges, a temperate diet, and blisters behind the ears, are all proper remedies,

and should be used together, or in succession, as the nature of the disease may require. Many persons have been cured of the same complaint by sleeping in woollen nightcaps. The morbid action in these cases is always of a feeble nature. With this remedy, tonics, particularly the bark and cold bath, will be proper. I have once known a chronic gouty pain in the head cured by an issue in the arm, after pounds of bark, and many other tonic remedies, had been taken to no purpose.

The *ophthalmia* from gout should be treated with the usual remedies for that disease when it arises from other causes, with the addition of such local applications to other and distant parts of the body, as may abstract the gouty action from the eye.

Dull but constant pains in the limbs yield to frictions, volatile liniments, muslin and woollen worn next to the skin, electricity, a salivation, and the warm and cold bath. A gentleman who was afflicted with a pain of this kind for three years and a half in one of his arms, informed me, that he had been cured by wearing a woollen stocking that had been boiled with sulphur in water, for two weeks upon the affected limb. He had previously worn flannel upon it, but without receiving any benefit from it. I have known wool and cotton, finely carded, and made into small mats, worn upon the hips, when affected by gout with great advantage. A cerecloth or taffety by touching the flesh at more, or at all points has been found to give great relief. Rubbing the limbs with castor oil, and wrapping them up in hot sand have likewise been useful. In obstinate sciatic pains, with fever or inflammation, Dr. Pitcairn's remedy, published by Dr. Cheyne, has performed many cures. It consists in taking from one to four tea spoons full of the fine spirit of turpentine every morning, for a week or ten days, in three times the quantity of honey, and afterwards in drinking a large quantity of sack whey, to settle it on the stomach, and carry it into the blood. An anodyne should be taken every night after taking this medicine.

A *gouty diarrhœa* should be treated with the usual astringent medicines of the shops. Blisters to the wrists and ankles, also a salivation, have often cured it. I have

heard of its being checked, after continuing for many years, by the patient eating large quantities of alspice, which he carried loose in his pocket for that purpose.

The *angina pectoris*, which I have said is a symptom of the gout, generally comes on with fulness and tension in the pulse. After these are reduced by two or three bleedings, mineral tonics seldom fail of giving relief.

Spasms in the stomach, and *pains in the bowels*, often seize gouty people in the midst of business, or pleasure, or in the middle of the night. My constant prescription for these complaints is ten drops of laudanum every half hour, till relief be obtained. If this medicine be taken in the forming state of these pains, a single dose generally removes the disease. It is preferable to spiced wine and spirits, inasmuch as it acts quicker, and leaves no disposition to contract a love for it when it is not required to ease pain.

The *pain in the rectum*, which has been described, yields to the common remedies for the piles. Cold water applied to the part, generally gives immediate relief.

For a *preternatural secretion and excretion of bile* gentle laxatives, and abstinence from oily food, full meals, and all violent exercises of the body and mind are proper.

The *itching in the anus*, which I have supposed to be a symptom of gout, has yielded in one instance that has come within my knowledge to mercurial ointment applied to the part affected. Dr. Lettsom recommends fomenting the part with a decoction of poppy heads and hemlock, and advises lenient purges and vegetable diet as a radical cure for the disease.*

For the *itching in the vagina* I have found a solution of the sugar of led in water to be an excellent palliative application. Dr. Lettsom recommends as a cure for it, the use of bark in delicate habits, and occasional bleeding, with a light and moderate diet if it occur about the time of the cessation of the menses.

Obstinate *cutaneous eruptions*, which are the effects of gout, have been cured by gentle physic, a suitable diet, issues, and applications of the unguentum citrinum to the parts affected.

* Medical Memoirs, vol. III.

The *arthritic gonorrhœa* should be treated with the same remedies as a gonorrhœa from any other cause.

In the treatment of all the local symptoms that have been enumerated, it will be of great consequence to inquire, before we attempt to cure them, whether they have not succeeded general gout, and thereby relieved the system from its effects in parts essential to life. If this have been the case, the cure of them should be undertaken with caution, and the danger of a local disease being exchanged for a general one, should be obviated by remedies that are calculated to eradicate the gouty diathesis altogether from the system. The means for this purpose, agreeably to our order, come next under our consideration. Before I enter upon this head, I shall premise, that I do not admit of the seeds of the gout remaining in the body to be eliminated by art after a complete termination of one of its paroxysms, any more than I admit of the seeds of a pleurisy or intermitting fever remaining in the body, after they have been cured by blood-letting or bark. A predisposition only remains in the system to a return of the gout, from its usual remote and exciting causes. The contrary idea took its rise in those ages of medicine in which morbid matter was supposed to be the proximate cause of the gout, but it has unfortunately continued since the rejection of that theory. Thus in many cases we see wrong habits continue long after the principles have been discarded, from which they were derived.

I have known several instances in which art, and I have heard and read of others in which accidental suffering from abstinence, pain, and terror have been the happy means of overcoming a predisposition to the gout. A gentleman from one of the West-India islands, who had been for many years afflicted with the gout, was perfectly cured of it by living a year or two upon the temperate diet of the jail in this city, into which he was thrown for debt by one of his creditors. A large hæmorrhage from the foot, inflamed and swelled by the gout, accidentally produced by a penknife which fell upon it, effected in an Irish gentleman a lasting cure of the disease. Hildanus mentions the history of a gentleman, whom he knew in-

tunately, who was radically cured of a gout with which he had been long afflicted, by the extreme bodily pain he suffered innocently from torture in the canton of Berne. He lived to be an old man and ever afterwards enjoyed good health.* The following letter from my brother contains the history of a case in which terror suddenly eradicated the gout from the system.

“*Reading July 27th, 1797.*

“DEAR BROTHER,

“WHEN I had the pleasure of seeing you last week, I mentioned an extraordinary cure of the gout in this town, by means of a *fright*. In compliance with your request, I now send an exact narration of the facts.

“Peter Fether, the person cured, is now alive, a householder in Reading, seventy-three years of age, a native of Germany, and a very hearty man. The first fit of the gout he ever had, was about the year 1773; and from that time till 1785, he had a regular attack in the spring of every year. His feet, hands, and elbows were much swollen and inflamed; the fits lasted long, and were excruciating. In particular, the last fit in 1785 was so severe, as to induce an apprehension, that it would inevitably carry him off, when he was suddenly relieved by the following accident.

“As he lay in a small back room adjoining the yard, it happened that one of his sons, in turning a wagon and horses, drove the tongue of the wagon with such force against the window, near which the old man lay stretched on a bed, as to beat in the sash of the window, and to scatter the pieces of broken glass all about him. To such a degree was he alarmed by the noise and violence, that he instantly leaped out of bed, forgot that he had ever used crutches, and eagerly inquired what was the matter. His wife, hearing the uproar, ran into the room, where, to her astonishment, she found her husband on his feet, bawling against the author of the mischief, with the most passionate vehemence. From *that* moment, he has been entirely exempt from the gout, has never had the slightest touch,

* Observat. Chirurg. I. Cent. Obs. 79.

of it, and *now* enjoys perfect health, has a good appetite, and says he was never heartier in his life. This is probably the more remarkable, when I add, that he has always been used to the hard work of a farm, and *since* the year 1785 has frequently mowed in his own meadow, which I understand is low and wet. I am well informed, in his mode of living, he has been temperate, occasionally indulging in a glass of wine, after the manner of the German farmers, but not to excess.

“To you, who have been long accustomed to explore diseases, I leave the task of developing the principles, on which this mysterious restoration from the lowest decrepitude and bodily wretchedness, to a state of perfect health, has been accomplished. I well know that tooth-achs, head-achs, hiccoughs, &c. are often removed by the sudden impression of fear, and that they return again. But to see a debilitated gouty frame instantly restored to vigour; to see the whole system in a moment, as it were, undergo a perfect and entire change, and the most inveterate and incurable disease *radically* expelled, is surely a *different* thing, and must be acknowledged a very singular and marvellous event. If an old man languishing under disease and infirmity, had *died* of mere fright, nobody would have been surprised at it; but that he should be absolutely cured, and his constitution renovated by it, is a most extraordinary fact, which while I am compelled to believe by unexceptionable evidence, I am totally at a loss to account for.

“I am your sincerely

“affectionate brother,

“JACOB RUSH.”

These facts, and many similar ones which might be mentioned, afford ample encouragement to proceed in enumerating the means which are proper to prevent the recurrence of the gout, or, in other words, to eradicate it from the system. Besides these cases of radical cures, it has often been suspended, from two to thirty years by the power of medicine.

V. I shall first mention the means of preventing the return of that state of the disease which is accompanied with *violent* action, and afterwards take notice of the

means of preventing the return of that state of it, in which a *feeble* morbid action takes place in the blood-vessels. The means for this purpose consists in avoiding all the remote, exciting, and predisposing causes of the gout which have been mentioned. I shall say a few words upon the most important of them, in the order that has been proposed.

I. The first remedy for obviating the *violent* state of gout is,

1. *Temperance*. This should be regulated in its degrees by the age, habits, and constitution of the patient. A diet consisting wholly of milk, vegetables, and simple water, has been found necessary to prevent the recurrence of the gout in some cases. It was cured in lord Nelson by two years' abstinence from wine and animal food, during which time he lived wholly upon milk and vegetables. But, in general, fish, eggs, the white meats and weak broths may be taken in small quantities once a day, with milk and vegetables at other times. A little salted meat, which affords less nourishment than fresh, may be eaten occasionally. It imparts vigour to the stomach, and prevents dyspepsia from a diet consisting chiefly of vegetables. The low and acid wines should be avoided, but weak Madeira or sherry wine and water, or small beer, may be drunken at meals. The latter liquor was the favourite drink of Dr. Sydenham in his fits of the gout. Strong tea and coffee should not be tasted, where there is reason to believe the habitual use of them has contributed to bring on the disease.

From the disposition of the gout to return in the spring and autumn, greater degrees of abstinence in eating and drinking will be necessary at those seasons than at any other time. With this diminution of aliment, gentle purges should be taken, to obviate an attack of the gout. In persons above fifty years of age, an abstemious mode of living should be commenced with great caution. It has sometimes, when entered upon suddenly, and carried to its utmost extent, induced fits of the gout, and precipitated death. In such persons, the abstractions from their usual diet should be small, and our dependence should be placed upon other means to prevent a return of the disease.

2. *Moderate labour and gentle exercise* have frequently removed that debility and vibratility in the blood-vessels, on which a predisposition to the gout depends. Hundreds of persons who have been reduced by misfortunes to the necessity of working for their daily bread, have thrown off a gouty diathesis derived from their parents, or acquired by personal acts of folly and intemperance. The employments of agriculture afford the most wholesome labour, and walking, the most salutary exercise. To be useful they should be moderate. The extremes of indolence and bodily activity meet in a point. They both induce debility, which predisposes to a recurrence of a fit of the gout. Riding in a carriage, and on horseback, are less proper as a means of preventing the disease than walking. Their action upon the body is partial. The lower limbs derive no benefit from it, and on these the violent state of gout generally makes its first attack. In England, many domestic exercises have been contrived for gouty people, such as shuttle-cock, bullets, the chamber-horse, and the like, but they are all trifling in their effects, compared with labour, and exercise in the open air. The efficacy of the former of those prophylactic remedies will appear in a strong point of light, when we consider, how much the operation of the remote and exciting causes of the gout which act more or less upon persons in the humblest ranks of society, are constantly counteracted in their effects, by the daily labour which is necessary for their subsistence.

3. To prevent the recurrence of the gout, cold should be carefully avoided, more especially when it is combined with moisture. Flannel should be worn next the skin in winter, and muslin in summer, in order to keep up a steady and uniform perspiration. Fleecy hosiery should be worn in cold weather upon the breast and knees, and the feet should be kept constantly warm and dry by means of socks and cork soled shoes. It was by wetting his feet, by standing two or three hours upon the damp ground that Colonel Miles produced the gout in his stomach and bowels which had nearly destroyed him in the year 1795.

4. Great moderation should be used by persons who are subject to the gout in the exercise of their understand-

ings and passions. Intense study, fear, terror, anger, and even joy, have often excited the disease into action. It has been observed, that the political and military passions act with more force upon the system, than those which are of a social and domestic nature; hence generals and statesmen are so often afflicted with the gout, and that too, as was hinted in another place, in moments the most critical and important to the welfare of a nation. The combination of the exercises of the understanding, and the passion of avarice in gaming, have often produced an attack of this disease.

These facts show the necessity of gouty people subjecting their minds, with all their operations to the government of reason and religion. The understanding should be exercised only upon light and pleasant subjects. No study should ever be pursued till it brings on fatigue; and above all things, midnight and even late studies should be strictly avoided. A gouty man should always be in bed at an early hour. This advice has the sanction of Dr. Sydenham's name, and experience proves its efficacy in all chronic diseases.

5. The venereal appetite should be indulged with moderation. And,

6. Costiveness should be prevented by all persons who wish to escape a return of violent fits of the gout. Sulphur is an excellent remedy for this purpose. Dr. Cheyne commends it in high terms. His words are, "Sulphur is one of the best remedies in the intervals of the gout. In the whole extent of the materia medica, I know not a more safe and active medicine."* Two cases have come within my knowledge, in which it has kept off fits of the gout for several years, in persons who had been accustomed to have them once or twice a year. Rhubarb in small quantities chewed, or in the form of pills, may be taken to obviate costiveness, by persons who object to the habitual use of sulphur. Dr. Cheyne, who is lavish in his praises of that medicine as a gentle laxative, says, he "knew a noble lord of great worth and much gout, who, by taking from the hands of a quack a drachm of rhubarb, tinged with cochineal to disguise it, every morning for six

* Essay on the Nature and True Method of Treating the Gout, p. 36.

weeks, lived in health, for four years after, without any symptom of it.”*

I have said that abstinence should be enjoined with more strictness in the spring and autumn, than at any other time, to prevent a return of the gout. From the influence of the weather at those seasons in exciting febrile actions in the system, the loss of a pint of blood will be useful in some cases for the same purpose. It will be the more necessary if the gout has not paid its habitual visits to the system. The late Dr. Gregory had been accustomed to an attack of the gout every spring. Two seasons passed away without his feeling any symptoms of it. He began to flatter himself with a hope that the predisposition to the disease had left him. Soon afterwards he died suddenly of an apoplexy. The loss of a few ounces of blood at the usual time in which the gout affected him, would probably have protracted his life for many years. In the year 1796, in visiting a patient, I was accidentally introduced into a room where a gentleman from the Delaware state had been lying on his back for near six weeks with an acute fit of the gout. He gave me a history of his sufferings. His pulse was full and tense, and his whole body was covered with sweat from the intensity of his pain. He had not had his bowels opened for ten days. I advised purging and bleeding in his case. The very names of those remedies startled him, for he had adopted the opinion of the salutary nature of a fit of the gout, and therefore hugged his chains. After explaining the reason of my prescriptions, he informed me, in support of them, that he had escaped the gout, but two years in twenty, and that in one of these two years he had been bled for a fall from his horse, and, in the other, his body had been reduced by a chronic fever, previously to the time of the annual visit of his gout.

As a proof of the efficacy of active, or passive depletion, in preventing the gout, it has been found that persons who sweat freely, either generally or partially, or who make a great deal of water, are rarely affected by it.

An epitome of all that has been said upon the means of preventing a return of the gout, may be delivered in a

few words. A man who has had one fit of it, should consider himself in the same state as a man who has received the seeds of a malignant fever into his blood. He should treat his body as if it were a Florence flask. By this means he will probably prevent, during his life, the re-excitement of the disease.

Are *issues* proper to prevent the return of the violent state of gout? I have heard of an instance of an issue in the leg having been effectual for this purpose; but if the remedies before-mentioned be used in the manner that has been directed, so unpleasant a remedy can seldom be necessary.

Are *bitters* proper to prevent a return of this state of gout? It will be a sufficient answer to this question to mention, that the duke of Portland's powder, which is composed of bitter ingredients, excited a fatal gout in many people who used it for that purpose. I should as soon expect to see gold produced by the operations of fire upon copper or lead, as expect to see the gout prevented or cured by any medicine that acted upon the system, without the aid of more or less of the remedies that have been mentioned.

II. We come now, in the last place, to mention the remedies which are proper to prevent a return of that state of gout which is attended with a *feeble* morbid action in the blood vessels and viscera.

This state of gout generally occurs in the evening of life, and in persons of delicate habits, or in such as have had their constitutions worn down by repeated attacks of the disease.

The remedies to prevent it are,

1. A *gently stimulating diet*, consisting of animal food well cooked, with sound old Madeira or sherry wine, or weak spirit and water. Salted, and even smoked meat may be taken, in this state of the system, with advantage. It is an agreeable tonic, and is less disposed to create plethora than fresh meat. Pickles and vinegar should seldom be tasted. They dispose to gouty spasms in the stomach and bowels. Long intervals between meals should be carefully avoided. The stomach, when over-stretched or empty, is always alike predisposed to disease.

There are cases in which the evils of inanition in the stomach will be prevented, by a gouty patient eating in the middle of the night.

2. The use of *chalybeate medicines*. These are more safe when used habitually, than bitters. I have long been in the practice of giving the different preparations of iron in large doses, in chronic diseases, and in that state of debility which disposes to them. A lady of a weak constitution informed Dr. Cheyne that she once asked Dr. Sydenham how long she might safely take steel. His answer was that "she might take it for thirty years, and then begin again if she continued ill."*

Water impregnated with iron, either by nature or art, may be taken instead of the solid forms of the metal. It will be more useful if it be drunken in a place where patients will have the benefit of country air.

3. The habitual use of the *volatile tincture of gum guaiacum*, and of other cordial and gently stimulating medicines. A clove of garlic taken once or twice a day, has been found useful in debilitated habits predisposed to the gout. It possesses a wonderful power in bringing latent excitement into action. It moreover acts agreeably upon the nervous system.

Mr. Small found great benefit from breakfasting upon a tea made of half a drachm of ginger cut into small slices, in preventing occasional attacks of the gout in his stomach. Sir Joseph Banks was much relieved by a diet of milk, with ginger boiled in it. The root of the sassafras of our country might probably be used with advantage for the same purpose. Aurelian speaks of certain remedies for the gout which he calls "*annalia*."† The above medicines belong to this class. To be effectual, they should be persisted in, not for one year only, but for many years.

4. *Warmth*, uniformly applied, by means of suitable dresses, and sitting rooms, to every part of the body.

5. The *warm bath* in winter, and the *temperate* or *cold bath* in summer.

6. *Exercise*. This may be in a carriage, or on horseback. The viscera being debilitated in this state of pre-

* Essay on the Nature and True Method of Treating the Gout, p. 69.

† Morborum Chronisorum. Lib. v. Cap. 2.

disposition to the gout, are strengthened in a peculiar manner by the gentle motion of a horse. Where this or other modes of passive exercise cannot be had, frictions to the limbs and body should be used every day.

7. *Costiveness* should be avoided by taking occasionally one or two table spoonsfull of Dr. Warner's purging tincture prepared by infusing rhubarb, orange peel, and caraway seeds, of each an ounce, for three days in a quart of Madeira, or any other white wine. If this medicine be ineffectual for opening the bowels, rhubarb may be taken in the manner formerly mentioned.

8. The understanding and passions should be constantly employed in agreeable studies and pursuits. Fatigue of mind and body should be carefully avoided.

9. A warm climate often protracts life in persons subject to this state of gout. The citizens of Rome who had worn down their constitutions by intemperance, added many years to their lives, by migrating to Naples, and enjoying there, in a warmer sun, the pure air of the Mediterranean, and sir William Temple says the Portuguese obtain the same benefit by transporting themselves to the Brazils, after medicine and diet cease to impart vigour to their constitutions in their native country.

Thus have I enumerated the principal remedies for curing and preventing the gout. Most of them are to be met with in books of medicine, but they have been administered by physicians, or taken by patients with so little regard to the different states of the system, that they have in many instances done more harm than good. Solomon places all wisdom, in the management of human affairs, in finding out the proper times for performing certain actions. Skill in medicine consists in an eminent degree in timing remedies. There is a time to bleed, and a time to withhold the lancet. There is a time to give physic, and a time to trust to the operations of nature. There is a time to eat meat, and there is a time to abstain from it. There is a time to give tonic medicines, and a time to refrain from them. In a word, the cure of the gout depends wholly upon two things, viz. *proper remedies*, in their *proper times*, and *places*.

I shall take leave of this disease, by comparing it to a deep and dreary cave in a new country, in which ferocious beasts and venomous reptiles, with numerous ghosts and hobgoblins, are said to reside. The neighbours point at the entrance of this cave with horror, and tell of the many ravages that have been committed upon their domestic animals, by the cruel tenants which inhabit it. At length a school boy, careless of his safety, ventures to enter this subterraneous cavern, when! to his great delight he finds nothing in it but the same kind of stones and water he left behind him upon the surface of the earth. In like manner, I have found no other principles necessary to explain the cause of the gout, and no other remedies necessary to cure it, than such as are admitted in explaining the causes, and in prescribing for the most simple and common diseases.

The following is an epitome of the opinions upon the cause and cure of the gout, which are contained in the preceding observations, most of which are opposed by modern systems of medicine.

1. The gout does not depend upon a *specific action* in the blood-vessels, any more than it does upon a specific morbid matter.

2. It is not seated exclusively in the joints, nor in the limbs.

3. It is not induced exclusively by ardent nor fermented liquors, nor by intemperance in eating, but by every other cause that induces chronic debility from action or abstraction; also by the causes that induce nearly all other diseases.

4. It is more common in the female than in the male sex, and that in the ratio of ten to one.

5. It differs from the rheumatism, only in its seats and grades.

6. There is no specific remedy for it. The numerous and pompous specifics that have been recommended for its cure, are melancholy records of the imperfection and obliquity of the human understanding.

7. It is, notwithstanding, subject to the power of medicine; and may be cured by the application of the same

principles and remedies to it, which cure other acute and chronic diseases.

8. It is not necessary, in order to prevent or cure the gout, to translate or to fix it in the limbs. It should be chased out of the system.

9. It is not a healthy, nor a friendly disease.

10. It does not cure other diseases. It suspends weak diseases only, when it attacks with great force. But while it suspends weak diseases, it aggravates all such as are of a violent nature.

OBSERVATIONS
UPON
THE CAUSE AND CURE
OF THE
HYDROPHOBIA.

OBSERVATIONS, &c.

IN entering upon the consideration of this formidable disease, I feel myself under an involuntary impression, somewhat like that which was produced by the order the king of Syria gave to his captains when he was conducting them to battle: "Fight not with small or great, save only with the king of Israel."* In whatever light we contemplate the hydrophobia, it may be considered as pre-eminent in power and mortality, over all diseases.

It is now many years since the distress and horror excited by it, both in patients and their friends, led me with great solicitude to investigate its nature. I have at length satisfied myself with a theory of it, which, I hope, will lead to a rational and successful mode of treating it.

For a history of the symptoms of the disease, and many interesting facts connected with it, I beg leave to refer the reader to Dr. Mease's learned and ingenious inaugural dissertation, published in the year 1792.

The remote and exciting causes of the hydrophobia are as follow:

1. The bite of a rabid animal. Wolves, foxes, cats, as well as dogs, impart the disease. It has been said that blood must be drawn in order to produce it, but I have heard of a case in Lancaster county, in Pennsylvania, in which a severe contusion, by the teeth of the rabid animal, without the effusion of a single drop of red blood, excited the disease. Happily for mankind, it cannot be communicated by blood or saliva falling upon sound parts of the body. In Maryland, the negroes eat with safety the flesh of hogs that have perished from the bite of mad dogs; and I have heard of the milk of a cow, at Chestertown, in the same state, having been used without any inconvenience by a whole family, on the very day in which she was affected by this disease, and which killed her in a few

* 2 Chron xviii. 30.

hours. Dr. Baumgarten confirms these facts by saying that "the flesh and milk of rabid animals have been eaten with perfect impunity."*

In the following observations I shall confine myself chiefly to the treatment of the hydrophobia which arises from the bite of a rabid animal, but I shall add in this place a short account of all its other causes.

2. Cold night air. Dr. Arthaud, late president of the society of Philadelphia in St. Domingo, has published several cases, in which it was produced in negroes by sleeping all night in the open air.

3. A wound in a tendinous part.

4. Putrid and impure animal food.

5. Worms.

6. Eating beech nuts.

7. Great thirst.

8. Exposure to intense heat.

9. Drinking cold water when the body was very much heated.

10. A fall.

11. Fear.

12. Hysteria.

13. Epilepsy.

14. Tetanus.

15. Hydrocephalus. Of the presence of hydrophobia in the hydrocephalic state of fever, there have been several instances in Philadelphia.

16. An inflammation of the stomach.

17. The dysentery.

18. The typhus fever. Dr. Trotter mentions the hydrophobia as a symptom which frequently occurred in the typhus state of fever in the British navy.†

19. It is taken notice of likewise in a putrid fever by Dr. Coste;‡ and Dr. Griffiths observed it in a high degree in a young lady who died of the yellow fever, in 1793.

20. The bite of an angry, but not a diseased animal.

21. An involuntary association of ideas.

Cases of spontaneous hydrophobia from all the above

* Medical Commentaries, Philadelphia edition, vol. 7. p. 409.

† Medicina Nautica, p. 301

‡ Medical Commentaries, Dobson's edition, vol. II. p. 476.

causes are to be met with in practical writers, and of most of them in M. Audry's learned work, entitled, "*Recherches sur la Rage.*"

The dread of water, from which this disease derives its name, has few distinct grades. 1. It cannot be drunken. 2. It cannot be touched. 3. The sound of it pouring from one vessel to another, 4. the sight of it, and 5, even the naming of it, cannot be borne, without exciting convulsions. But this symptom is not a universal one. Dr. Mead mentions three cases in which there was no dread of water, in persons who received the disease from the bite of a rabid animal. It is unfortunate for this disease, as well as many others, that a single symptom should impose names upon them. In the present instance it has done great harm, by fixing the attention of physicians so exclusively upon the dread of water which occurs in it, that they have in a great measure overlooked every other circumstance which belongs to the disease. The theory of the hydrophobia, which an examination of its causes, symptoms, and accidental cures, with all the industry I was capable of, has led me to adopt, is, that it is a *malignant state of fever*. My reasons for this opinion are as follow :

1. The disease in all rabid animals is a fever. This is obvious in dogs who are most subject to it. It is induced in them by the usual causes of fever, such as scanty or putrid aliment,* extreme cold, and the sudden action of heat upon their bodies. Proofs of its being derived from each of the above causes are to be met with in most of the authors who have written upon it. The animal matters which are rendered morbid by the action of the above causes upon them, are determined to the saliva, in which a change seems to be induced, similar to that which takes place in the perspirable matter of the human species from the operation of similar causes upon it. This matter it is well known, is the remote cause of the jail fever. No wonder the saliva of a dog should produce a disease of

* "Animal food, in a state of putridity, is amongst the most frequent causes of canine madness"

"Canine madness chiefly arises from the excessive number of ill-kept and ill-fed dogs."

the same kind, after being vitiated by the same causes, and thereby disposed to produce the same effects.

2. The disease called canine madness, prevails occasionally among dogs at those times in which malignant fevers are epidemic. This will not surprise those persons who have been accustomed to observe the prevalence of the influenza and bilious fevers among other domestic animals at a time when they are epidemic among the human species.

3. Dogs, when they are said to be mad, exhibit the usual symptoms of fever, such as a want of appetite, great heat, a dull, fierce, red, or watery eye, indisposition to motion, sleepiness, delirium, and madness. The symptom of madness is far from being universal, and hence many dogs are diseased and die with this malignant fever, that are inoffensive, and instead of biting, continue to fawn upon their masters. Nor is the disposition of the fever to communicate itself by infection universal among dogs any more than the same fever in the human species, and this I suppose to be one reason why many people are bitten by what are called mad dogs, who never suffer any inconvenience from it.

4. A dissection of a dog, by Dr. Cooper, that died with this fever, exhibited all the usual marks of inflammation and effusion which takes place in common malignant fevers. I shall in another place mention a fifth argument in favour of the disease in dogs being a malignant fever, from the efficacy of one of the most powerful remedies in that state of fever, having cured it in two instances.

II. The disease produced in the human species by the bite of a rabid animal, is a *malignant* fever. This appears first from its symptoms. These, as recorded by Aurelian, Mead, Fothergill, Plummer, Arnold, Baumgarten, and Morgagni, are chills, great heat, thirst, nausea, a burning sensation in the stomach, vomiting, costiveness; a small, quick, tense, irregular, intermitting, natural, or slow pulse; a cool skin, great sensibility to cold air, partial cold and clammy sweats on the hands, or sweats accompanied with a warm skin diffused all over the body, difficulty of breathing, sighing, restlessness, hiccough, giddiness, head-ach, delirium, coma, false vision, dilatation of the pupils, dul-

ness of sight, blindness, glandular swellings, heat of urine, priapism, palpitation of the heart, and convulsions. I know that there are cases of hydrophobia upon record, in which there is said to be a total absence of fever. The same thing has been said of the plague. In both cases the supposed absence of fever is the effect of stimulus acting upon the blood-vessels with so much force as to suspend morbid action in them. By abstracting a part of this stimulus, a fever is excited, which soon discovers itself in the pulse and on the skin, and frequently in pains in every part of the body. The dread of water, and the great sensibility of the system to cold air, are said to give a specific character to the hydrophobia; but the former symptom, it has been often seen, occurs in diseases from other causes, and the latter has been frequently observed in the yellow fever. It is no more extraordinary than a fever excited by the bite of a rabid animal should excite a dread of water, than that fevers from other causes should produce aversion from certain aliments, from light, and from sounds of all kinds; nor is it any more a departure from the known laws of stimulents, that the saliva of a mad dog should affect the fauces, than that mercury should affect the salivary glands. Both stimuli appear to act in a specific manner.

2. The hydrophobia partakes of the character of a malignant fever, in appearing at different intervals from the time in which the infection is received into the body. These intervals are from one day to five or six months. The small-pox shows itself in intervals from eight to twenty days, and the plague and yellow fever from the moment in which the miasmata are inhaled, to nearly the same distance of time. This latitude in the periods at which infectious and contagious matters are brought into action in the body, must be resolved into the influence which the season of the year, the habits of the patients, and the passion of fear have upon them.

Where the interval between the time of being bitten, and the appearance of a dread of water, exceeds five or six months, it is probable it may be occasioned by a disease derived from another cause. Such a person is pre-disposed in common with other people to all the diseases

of which the hydrophobia is a symptom. The recollection of the poisonous wound he has received, and its usual consequences, is seldom absent from his mind for months or years. A fever, or an affection of his nerves from their most common causes, cannot fail of exciting in him apprehensions of the disease which usually follows the accident to which he has been exposed. His fears are then let loose upon his system, and produce in a short time a dread of water which appears to be wholly unconnected with the bite of a rabid animal. Similar instances of the effects of fear upon the human body are to be met with in books of medicine. The pains produced by fear acting upon the imagination in supposed venereal infections, are as real and severe as they are in the worst state of that disease.

3. Blood drawn in the hydrophobia exhibits the same appearances which have been remarked in malignant fevers. In Mr. Bellamy, the gentleman whose case is so minutely related by Dr. Fothergill, the blood discovered with "slight traces of size, *serum* remarkably *yellow*." It was uncommonly sizy in a boy of Mr. George Oakley whom I saw and bled for the first time, on the fourth day of his disease, in the beginning of the year 1797. His pulse imparted to the fingers the same kind of quick and tense stroke, which is common in an acute inflammatory fever. He died in convulsions the next day. He had been bitten by a mad dog on one of his temples, three weeks before he discovered any signs of indisposition. There are several other cases upon record, of the blood exhibiting, in this disease, the same appearances as in common malignant and inflammatory fevers.

4. The hydrophobia accords exactly with malignant fevers in its duration. It generally terminates in death, according to its violence, and the habit of the patient, in the first, second, third, fourth, or fifth day, from the time of its attack, and with the same symptoms which attend the last stage of malignant fevers.

5. The body, after death from the hydrophobia, putrefies with the same rapidity that it does after death from a malignant fever in which no depletion has been used.

6. Dissections of bodies which have died of the hy-

drophobia, exhibit the same appearances which are observed on the bodies of persons who have perished of malignant fevers. These appearances according to Morgagni and Sauvage,* are marks of inflammation in the throat, œsophagus, trachea, brain, stomach, liver, and bowels. Effusions of water, and congestions of blood in the brain, large quantities of dark-coloured or black bile in the gall-bladder and stomach, mortifications in the bowels and bladder, livid spots on the surface of the body, and, above all, the arteries filled with fluid blood and the veins nearly empty. I am aware that two cases of death from hydrophobia are related by Dr. Vaughan, in which no appearance of disease was discovered by dissection in any part of the body. Similar appearances have occasionally been met with in persons who have died of malignant fevers. In another place I hope to prove, that we err in placing disease in inflammation, for it is one of its primary effects only, and hence, as was before remarked, it does not take place in many instances in malignant fevers, until the arteries are so far relaxed by two or three bleedings, as to be able to relieve themselves by effusing red blood into serous vessels, and thus to produce that error loci which I shall say hereafter is essential to inflammation.† The existence of this grade of action in the arteries may always be known by the presence of sizzly blood, and by the more obvious and common symptoms of fever.

The remedies for hydrophobia, according to the principles I have endeavoured to establish, divide themselves naturally into two kinds.

I. Such as are proper to prevent the disease, after the infection of the rabid animal is received into the body.

II. Such as are proper to cure it when formed.

I. The first remedy under the first general head is, ab-

* *Bibliothèque Choisie de Médecine*, tome XV p. 210.

† In the 6th volume of the *Medical Observations and Inquiries*, there is an account of the dissection of a person who had been destroyed by taking opium. "No morbid appearance (says Mr. Whately, the surgeon who opened the body) was found in any part of the body, except that the villous coat of the stomach was very slightly inflamed." The stimulus of the opium in this case either produced an action which transcended inflammation, or destroyed action altogether by its immense force, by which means the more common morbid appearances which follow disease in a dead body could not take place.

stracting or destroying the virus, by cutting or burning out the wounded part, or by long and frequent effusions of water upon it, agreeably to the advice of Dr. Haygarth, in order to wash the saliva from it. The small pox has been prevented, by cutting out the part in which the puncture was made in the arm with variolous matter. There is no reason why the same practice should not succeed, if used in time, in the hydrophobia. Where it has failed of success, it has probably been used after the poison has contaminated the blood. The wound should be kept open and running for several months. In this way a servant girl, who was bitten by the same cat that bit Mr. Bellamy, is supposed by D. Fothergill to have escaped the disease. Dr. Weston of Jamaica believes that he prevented the disease by the same means, in two instances. Perhaps an advantage would arise from exciting a good deal of inflammation in the wound. We observe after inoculation, that the more inflamed the puncture becomes, and the greater the discharge from it, the less fever and eruption follow in the small-pox. The inflammation in both cases prevents the absorption of the poison, by abstracting the usual excitement or capacity of action in the lymphatics, and concentrating it in the blood-vessels.

A second preventive is a low diet, such as has been often used with success to mitigate the plague and yellow fever. The system, in this case, bends beneath the stimulus of the morbid saliva, and thus obviates or lessens its effects at a future day.

During the use of these means to prevent the disease, the utmost care should be taken to keep up our patient's spirits, by inspiring confidence in the remedies prescribed for him.

Mercury has been used in order to prevent the disease. There are many well attested cases upon record, of persons who have been salivated after being bitten by mad animals, in whom the disease did not show itself, but there are an equal number of cases to be met with, in which a salivation did not prevent it. From this it would seem probable, that the saliva did not infect in the cases in which the disease was supposed to have been prevented by the

mercury. At the time calomel was used to prepare the body for the small-pox, a salivation was often induced by it. The affection of the salivary glands in many instances lessened the number of pocks but I believe in no instance prevented the eruptive fever.

I shall say nothing here of the many other medicines which have been used to prevent the disease. No one of them has, I believe, done any more good than the boasted specifics which have been used to eradicate the gout, or to procure old age. They appear to have derived their credit from some of the following circumstances accompanying the bite of the animal.

1. The animal may have been angry, but not diseased with a malignant fever, such as I have described.

2. He may have been diseased, but not to such a degree as to have rendered his saliva infectious.

3. The saliva, when infectious, may have been so washed off in passing through the patient's clothes, as not to have entered the wound made in the flesh. And

4. There may have been no predisposition in the patient to receive the fever. This is often observed in persons exposed to the plague, yellow fever, small-pox, and to the infection of the itch, and the venereal disease.

II. The hydrophobia, like the small-pox, generally comes on with some pain, and inflammation in the part in which the infection was infused into the body, but to this remark, as in the small-pox, there are some exceptions. As soon as the disease discovers itself, whether by pain or inflammation in the wounded part, or by any of the symptoms formerly mentioned, the first remedy indicated is *blood-letting*. All the facts which have been mentioned, relative to its cause, symptoms, and the appearances of the body after death, concur to enforce the use of the lancet in this disease. Its affinity to the plague and yellow fever in its force, is an additional argument in favour of that remedy. To be effectual, it should be used in the most liberal manner. The loss of 100 to 200 ounces of blood will probably be necessary in most cases to effect a cure. The pulse should govern the use of the lancet as in other states of fever, taking care not to be imposed upon by the absence of *frequency* in it, in the

supposed absence of fever, and of *tension* in affections of the stomach, bowels, and brain. This practice, in the extent I have recommended it, is justified not only by the theory of the disease, but by its having been used with success in the following cases.

Dr. Nugent cured a woman by two copious bleedings, and afterwards by the use of sweating and cordial medicines.

Mr. Wrightson was encouraged by Dr. Nugent's success to use the same remedies with the same happy issue in a boy of 15 years of age.*

Mr. Falconer cured a young woman by the name of Hannah Moore, by a "copious bleeding," and another depleting remedy to be mentioned hereafter.†

Mr. Poupart cured a woman by bleeding until she fainted, and Mr. Berger gives an account of a number of persons being bitten by a rabid animal, all of whom died, except two who were saved by bleeding.‡

In the 40th volume of the Transactions of the Royal Society of London, there is an account of a man being cured of hydrophobia by Dr. Hartley, by the loss of 120 ounces of blood.

Dr. Tilton cured this disease in a woman in the Delaware state by very copious bleeding. The remedy was suggested to the doctor by an account taken from a London magazine of a dreadful hydrophobia being cured by an accidental and profuse hæmorrhage from the temporal artery.§

A case is related by Dr. Innes,|| of the loss of 116 ounces of blood in seven days having cured this disease. In the patient who was the subject of this cure, the bleeding was used in the most depressed, and apparently weak state of the pulse. It rose constantly with the loss of blood.

The cases related by Dr. Tilton and Dr. Innes, were said to be of a spontaneous nature, but the morbid actions were exactly the same in both patients with those which

* Medical Transactions, vol. ii. p. 192.

† Ditto p. 222

‡ Bibliotheque Choisie de Medecine, tome xv. p. 212.

§ Medical Essays of Edinburgh, vol. i. p. 226.

|| Medical Commentaries, vol. iii. p. 496.

are derived from the bite of a rabid animal. There is but one remote cause of disease, and that is stimulus, and it is of no consequence in the disease now under consideration, whether the dread of water be the effect of the saliva of a rabid animal acting upon the fauces, or of a morbid excitement determined to those parts by any other stimulus. The inflammation of the stomach depends upon the same kind of morbid action, whether it be produced by the miasmata of the yellow fever, or the usual remote and exciting causes of the gout. An apoplexy is the same disease when it arises from a contusion by external violence, that it is when it arises spontaneously from the congestion of blood or water in the brain. A dropsy from obstructions in the liver induced by strong drink, does not differ in its proximate cause from the dropsy brought on by the obstructions in the same viscus which are left by a neglected, or half cured billious fever. These remarks are of extensive application, and, if duly attended to, would deliver us from a mass of error which has been accumulating for ages in medicine: I mean the nomenclature of diseases from their remote causes. It is the most offensive and injurious part of the rubbish of our science.

I grant that bleeding has been used in some instances in hydrophobia without effect, but in all such cases it was probably used out of time, or in too sparing a manner. The credit of this remedy has suffered in many other diseases from the same causes. I beg it may not be tried in this disease, by any physician who has not renounced our modern systems of nosology, and adopted, in their utmost extent, the principles and practice of Botallus and Sydenham in the treatment of malignant fevers.

Before I quit the subject of blood-letting in hydrophobia, I have to add, that it has been used with success in two instances in dogs that had exhibited all the usual symptoms of what has been called madness. In one case, blood was drawn by cutting off the tail, in the other, by cutting off the ears of the diseased animal. I mention these facts with pleasure, not only because they serve to support the theory and practice which I have endeavoured to establish in this disease, but because they will render it unnecessary to destroy the life of a useful and af-

fectionate animal in order to prevent his spreading it. By curing it in a dog by means of bleeding, we moreover beget confidence in the same remedy in persons who have been bitten by him, and thus lessen the force of the disease, by preventing the operation of fear upon the system.

2. Purges and clysters have been found useful in the hydrophobia. They discharge bile which is frequently vitiated, and reduce morbid action in the stomach and blood-vessels. Dr. Coste ascribes the cure of a young woman in a convent wholly to clysters given five or six times every day.

3. Sweating after bleeding completed the cure of the boy whose case is mentioned by Mr. Wrightson. Dr. Baumgarten speaks highly of this mode of depleting, and says further, that it has never been cured "but by evacuations of some kind."

4. All the advantages which attend a salivation in common malignant fevers, are to be expected from it in the hydrophobia. It aided blood-letting in two persons who were cured by Mr. Falconer and Dr. Le Crompt.

There are several cases upon record in which musk and opium have afforded evident relief in this disease.

A physician in Virginia cured it by large doses of bark and wine. I have no doubt of the efficacy of these remedies when the disease is attended with a moderate or feeble morbid action in the system, for I take it for granted, it resembles malignant fevers from other causes in appearing in different grades of force. In its more violent and common form, stimulants of all kinds must do harm, unless they are of such a nature, and exhibited in such quantities, as to exceed in their force the stimulus of the disease; but this is not to be expected, more especially as the stomach is for the most part so irritable as sometimes to reject the mildest aliments as well as the most gentle medicines.

After the morbid actions in the system have been weakened, tonic remedies would probably be useful in accelerating the cure.

Blisters and stimulating cataplasms, applied to the feet, might probably be used with the same advantage in the

declining state of the disease, that they have been used in the same stage of other malignant fevers.

The cold bath, also long immersion in cold water, have been frequently used in this disease. The former aided the lancet, in the cure of the man whose case is related by Dr. Hartley. There can be no objection to the cold water in either of the above forms, provided no dread is excited by it in the mind of the patient.

The reader will perceive here that I have deserted an opinion which I formerly held upon the cause and cure of the tetanus. I supposed the hydrophobia to depend upon debility. This debility I have since been led to consider as partial, depending upon abstraction of excitement from some, and a morbid accumulation of it in other parts of the body. The preternatural excitement predominates so far, in most cases of hydrophobia, over debility, that depleting remedies promise more speedily and safely to equalize, and render it natural, than medicines of an opposite character.

In the treatment of those cases of hydrophobia which are not derived from the bite of a rabid animal, regard should always be had to its remote and exciting causes, so as to accommodate the remedies to them.

The imperfection of the present nomenclature of medicine has become the subject of general complaint. The mortality of the disease from the bite of a rabid animal has been increased by its name. The terms hydrophobia and canine madness convey ideas of the symptoms of the disease only, and of such of them too as are by no means universal. If the theory I have delivered, and the practice I have recommended, be just, it ought to be called the hydrophobic state of fever. This name associates it at once with all the other states of fever, and leads us to treat it with the remedies which are proper in its kindred diseases, and to vary them constantly with the varying state of the system.

In reviewing what has been said of this disease, I dare not say that I have not been misled by the principles of fever which I have adopted; but if I have, I hope the reader will not be discouraged by my errors, from using

his reason in medicine. By contemplating those errors, he may perhaps avoid the shoals upon which I have been wrecked. In all his researches, let him ever remember that there is the same difference between the knowledge of a physician who prescribes for diseases as limited by genera and species, and of one who prescribes under the direction of just principles, that there is between the knowledge we obtain of the nature and extent of the sky, by viewing a few feet of it from the bottom of a well, and viewing from the top of a mountain the whole canopy of heaven.

Since the first edition of the foregoing observations, I have seen a communication to the editors of the *Medical Repository*,* by Dr. Physick, which has thrown new light upon this obscure disease, and which I hope, will aid the remedies that have been proposed, in rendering them more effectual for its cure. The doctor supposes death from hydrophobia to be the effect of a sudden and spasmodic constriction of the glottis, inducing suffocation, and that it might be prevented by creating an artificial passage for air into the lungs, whereby life might be continued long enough to admit of the disease being cured by other remedies. The following account of a dissection is intended to show the probability of the doctor's proposal being attended with success.

On the 13th of September, 1802, I was called, with Dr. Physick, to visit, in consultation with Dr. Griffitts, the son of William Todd, Esq. aged five years, who was ill with the disease called hydrophobia, brought on by the bite of a mad dog, on the 6th of the preceding month. The wound was small, and on his cheek, near his mouth, two circumstances which are said at all times to increase the danger of wounds from rabid animals. From the time he was bitten, he used the cold bath daily, and took the infusion, powder, and seeds of the anagallis, in succession until the 9th of September, when he was seized with a fever which at first resembled the remittent of the season. Bleeding, purging, blisters, and the warm bath were prescribed for him,

* Volume V.

but without success. The last named remedy appeared to afford him some relief, which he manifested by paddling and playing in the water. At the time I saw him he was much agitated, had frequent twitchings, laughed often, but, with this uncommon excitement in his muscles and nerves, his mind was unusually correct in all its operations.

He discovered no dread of water, except in one instance, when he turned from it with horror. He swallowed occasionally about a spoon full of it at a time, holding the cup in his own hand, as if to prevent too great a quantity being poured at once into his throat. The quick manner of his swallowing, and the intervals between each time of doing so were such as we sometimes observe in persons in the act of dying of acute diseases. Immediately after swallowing water, he looked pale, and panted for breath. He spoke rapidly, and with much difficulty. This was more remarkably the case when he attempted to pronounce the words *carriage*, *water*, and *river*. After speaking he panted for breath in the same manner that he did after drinking. He coughed and breathed as patients do in the moderate grade of the cynanche trachealis. The dog that had bitten him, Mr. Todd informed me, made a similar noise in attempting to bark, a day or two before he was killed. We proposed making an opening into his windpipe. To this his parents readily consented; but while we were preparing for the operation, such a change for the worse took place, that we concluded not to perform it. A cold sweat, with a feeble and quick pulse, came on; and he died suddenly, at 12 o'clock at night, about six hours after I first saw him. He retained his reason, and a playful humour, till the last minute of his life. An instance of the latter appeared in his throwing his handkerchief at his father just before he expired. The parents consented to our united request to examine his body. Dr. Griffiths being obliged to go into the country, and Dr. Physick being indisposed, I undertook this business the next morning; and, in the presence of Dr. John S. Dorsey (to whom I gave the dissecting knife,) and my pupil Mr. Murduck, I discovered the following

appearances. All the muscles of the neck had a livid colour, such as we sometimes observe, after death, in persons who died of the sore throat. The muscles employed in deglutition and speech were suffused with blood. The epiglottis was inflamed, and the glottis so thickened and contracted, as barely to admit a probe of the common size. The trachea below it was likewise inflamed, and thickened, and contained a quantity of mucus in it, such as we observe, now and then, after death from cynanche trachealis. The œsophagus exhibited no marks of disease; but the stomach had several inflamed spots upon it, and contained a matter of a brown appearance, and which emitted an offensive odour.

From the history of this dissection, and of many others in which much fewer marks appeared of violent disease, in parts whose actions are essential to life, it is highly probable death is not induced in the ordinary manner in which malignant fevers produce it, but by a sudden or gradual suffocation. It is the temporary closure of this aperture which produces the dread of swallowing liquids: hence the reason why they are swallowed suddenly, and with intervals, in the manner that has been described; for, should the glottis be closed during the time of two swallows, in the highly diseased state of the system which takes place in this disease, suffocation would be the immediate and certain consequence. The same difficulty and danger attend the swallowing saliva, and hence the symptom of spitting, which has been so often taken notice of in hydrophobia. Solids are swallowed more easily than fluids, only because they descend by intervals, and because a less closure of the glottis is sufficient to favour their passage into the stomach. This remark is confirmed by the frequent occurrence of death in the very act of swallowing, and that too with the common symptoms of suffocation. To account for death from this cause, and in the manner that has been described, it will be necessary to recollect, that fresh air is more necessary to the action of the lungs in a fever than in health, and much more so in a fever of a

malignant character, such as the hydrophobia appears to be, than in fevers of a milder nature. An aversion from swallowing liquids is not peculiar to this disease. It occurs occasionally in the yellow fever. It occurs likewise in the disease which has prevailed among the cats, both in Europe and America, and probably, in both instances, from a dread of suffocation in consequence of the closure of the glottis, and sudden abstraction of fresh air.

The seat of the disease, and cause of death, being, I hope, thus ascertained, the means of preventing death come next under our consideration. Tonic remedies, in all their forms, have been administered to no purpose. The theory of the disease would lead us to expect a remedy for it in blood-letting. But this, though now and then used with success, is not its cure, owing, as we now see, to the mortal seat of the disease being so far removed from the circulation, as not to be affected by the loss of blood in the most liberal quantity. As well might we expect the inflammation and pain of a paronychia, or what is called a felon on the finger, to be removed by the same remedy. Purging and sweating, though occasionally successful, have failed in many instances; and even a salivation, when excited (which is rarely the case,) has not cured it. An artificial aperture into the windpipe alone bids fair to arrest its tendency to death, by removing the symptom which generally induces it, and thereby giving time for other remedies, which have hitherto been unsuccessful, to produce their usual salutary effects in similar diseases.* In removing faintness, in drawing off the water in ischuria, in composing convulsions, and in stopping hæmorrhages in malignant fever, we do not cure the disease, but we prevent death, and thereby gain time for the use of the remedies which are proper to cure it. Laryngotomy according to Fourcroy's advice, in diseases of the throat which obstruct respiration, should be preferred to trache-

* The hoarse barking, or the total inability of mad dogs to bark, favours still further the idea that the mortal seat of the disease is in the glottis, and that the remedy which has been proposed is a rational one.

otomy, and the incision should be made in the triangular space between the thyroid and cricoid cartilages. Should this operation be adopted, in order to save life, it will not offer near so much violence to humanity as many other operations. We cut through a large mass of flesh into the bladder in extracting a stone. We cut into the cavity of the thorax in the operation for the empyema. We perforate the bones of the head in trepanning; and we cut through the uterus, in performing the Cæsarian operation, in order to save life. The operation of laryngotomy is much less painful and dangerous than any of them; and besides permitting the patient to breathe and to swallow, it is calculated to serve the inferior purpose of lessening the disease of the glottis by means of local depletion. After an aperture has been thus made through the larynx, the remedies should be such as are indicated by the state of the system, particularly by the state of the pulse. In hot climates it is, I believe, generally a disease of feeble re-action, and requires tonic remedies; but in the middle and northern states of America it is more commonly attended with so much activity and excitement of the blood-vessels, as to require copious blood-letting and other depleting remedies.

Should this new method of attacking this furious disease be adopted, and become generally successful, the discovery will place the ingenious gentleman who suggested it in the first rank of the medical benefactors of mankind.

I have only to add a fact upon this subject which may tend to increase confidence in a mode of preventing the disease, which has been recommended by Dr. Haygarth, and used with success in several instances. The same dog which bit Mr. Todd's son, bit at the same time, a cow, a pig, a dog, and a black servant of Mr. Todd's. The cow and pig died; the dog became mad, and was killed by his master. The black man, who was bitten on one of his fingers, exposed the wound for some time, immediately after he received it, to a stream of pump water, washed it likewise with soap and water. He happily escaped the disease, and is now in good

health. That his wound was poisoned is highly probable, from its having been made eight hours after the last of the above animals was bitten in which time there can be but little doubt of such a fresh secretion of saliva having taken place as would have produced the hydrophobia, had it not been prevented by the above simple remedy. I am not, however, so much encouraged by its happy issue in this case as to advise it in preference to cutting out the wounded part. It should only be resorted to where the fears of a patient, or his distance from a surgeon render it impossible to use the knife.

AN INQUIRY
INTO
THE CAUSE AND CURE
OF THE
CHOLERA INFANTUM.

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BY this name I mean to designate a disease, called in Philadelphia, the "vomiting and purging of children." From the regularity of its appearance in the summer months, it is likewise known by the name of "the disease of the season." It prevails in most of the large towns of the United States. It is distinguished in Charleston, in South Carolina, by the name of "the April and May disease," from making its first appearance in those two months. It seldom appears in Philadelphia till the middle of June, or the beginning of July, and generally continues till near the middle of September. Its frequency and danger are always in proportion to the heat of the weather. It affects children from the first or second week after their birth, till they are two years old. It sometimes begins with a diarrhœa, which continues for several days without any other symptom of indisposition; but it more frequently comes on with a violent vomiting and purging, and a high fever. The matter discharged from the stomach and bowels is generally yellow or green, but the stools are sometimes slimy and bloody, without any tincture of bile. In some instances they are nearly as limpid as water. Worms are frequently discharged in each kind of the stools that has been described. The children, in this stage of the disease, appear to suffer a good deal of

pain. They draw up their feet, and are never easy in one posture. The pulse is quick and weak. The head is unusually warm, while the extremities retain their natural heat, or incline to be cold. The fever is of the remitting kind, and discovers evident exacerbations, especially in the evenings. The disease affects the head so much, as in some instances to produce symptoms not only of delirium, but of mania, insomuch that the children throw their heads backwards and forwards, and sometimes make attempts to scratch, and to bite their parents, nurses, and even themselves. A swelling frequently occurs in the abdomen, and in the face and limbs. An intense thirst attends every stage of the disease. The eyes appear languid and hollow, and the children generally sleep with them half closed. Such is the insensibility of the system in some instances in this disease, that flies have been seen to alight upon the eyes when open, without exciting a motion in the eyelids to remove them. Sometimes the vomiting continues without the purging, but more generally the purging continues without the vomiting, through the whole course of the disease. The stools are frequently large, and extremely foetid, but in some instances they are without smell, and resemble drinks and aliments which have been taken into the body. The disease is sometimes fatal in a few days. I once saw it carry off a child in four and twenty hours. Its duration is varied by the season of the years, and by the changes in the temperature of the weather. A cool day frequently abates its violence, and disposes it to a favourable termination. It often continues with occasional variations in its appearance, for six weeks or two months. Where the disease has been of long continuance, the approach of death is gradual, and attended by a number of distressing symptoms. An emaciation of the body to such a degree, as that the bones come through the skin, livid spots, a singultus, convulsions, a strongly marked hippocratic countenance, and a sore mouth, generally precede the fatal termination of this disease. Few children ever recover, after the last symptoms which have been mentioned make their appearance.

This disease has been ascribed to several causes of each of which I shall take notice in order.

I. It has been attributed to dentition. To refute this opinion, it will be necessary to observe, that it appears only in one season of the year. Dentition, I acknowledge, sometimes aggravates it; hence we find it is most severe in that period of life, when the greatest number of teeth make their appearance, which is generally about the tenth month. I think I observed more children to die of this disease at that age, than at any other.

II. Worms have likewise been suspected of being the cause of this disease. To this opinion, I object the uncertainty of worms ever producing an idiopathic fever, and the improbability of their combining in such a manner as to produce an annual epidemic disease of any kind. But further, we often see the disease in all its force, before that age, in which worms usually produce diseases; we likewise often see it resist the most powerful anthelmintic medicines; and, lastly, it appears from dissection, where the disease has proved fatal, that not a single worm has been discovered in the bowels. It is true, worms, are in some instances discharged in this disease, but they are frequently discharged in greater numbers in the hydrocephalus internus, and in the small-pox, and yet who will assert either of those diseases to be produced by worms.

III. The summer fruits have been accused of producing this disease. To this opinion I object, that the disease is but little known in country places, where children eat much more fruit than in cities. As far as I have observed, I am disposed to believe, that the moderate use of ripe fruits, rather tends to prevent, than to induce the disease.

From the discharge of bile which generally introduces the disease, from the remissions and exacerbations of the fever which accompanies it, and from its occurring nearly in the same season with the cholera and remitting fever in adults, I am disposed to consider it as a modification of the same diseases. Its appearance

earlier in the season than the cholera and remitting fever in adults, must be ascribed to the constitutions of children being more predisposed from weakness to be acted upon, by the remote causes which produce those diseases.

I shall now mention the remedies which are proper and useful in this disease.

I. The first indication of cure is to evacuate the bile from the stomach and bowels. This should be done by gentle doses of ipecacuanha, or tartar emetic. The vomits should be repeated occasionally, if indicated, in every stage of the disease. The bowels should be opened by means of calomel, manna, castor oil, or magnesia. I have generally found rhubarb improper for this purpose, while the stomach was in a very irritable state. In those cases, where there is reason to believe that the offending contents of the primæ viæ have been discharged by nature (which is often the case,) the emetics and purges should by no means be given; but, instead of them, recourse must be had to

II. Opiates. A few drops of liquid laudanum, combined in a testaceous julep, with peppermint or cinnamon-water, seldom fail of composing the stomach and bowels. In some instances, this medicine alone subdues the disease in two or three days; but where it does not prove so successful, it produces a remission of pain, and of other distressing symptoms, in every stage of the disease.

III. Demulcent and diluting drinks have an agreeable effect in this disease. Mint and mallow teas, or a tea made of blackberry roots infused in cold water, together with a decoction of the shavings of hartshorn and gum arabic with cinnamon, should all be given in their turns for this purpose.

IV. Clysters made of flaxseed tea, or of mutton broth or of starch dissolved in water, with a few drops of liquid laudanum in them, give ease, and produce other useful effects.

V. Plaisters of Venice treacle applied to the region of the stomach, and flannels dipped in infusions of bitter,

and aromatic herbs in warm spirits, or Madeira wine, and applied to the region of the abdomen, often afford considerable relief.

VI. As soon as the more violent symptoms of the disease are composed, tonic and cordial medicines should be given. The bark in decoction or in substance (where it can be retained in that form,) mixed with a little nutmeg, often produces the most salutary effects. Port wine or claret mixed with water are likewise proper in this stage of the disease. After the disease has continued for some time, we often see an appetite suddenly awakened for articles of diet of a stimulating nature. I have seen many children recover from being gratified in an inclination to eat salted fish, and the different kinds of salted meat. In some instances they discover an appetite for butter, and the richest gravies of roasted meats, and eat them with obvious relief to all their symptoms. I once saw a child of sixteen months old perfectly restored, from the lowest stage of this disease, by eating large quantities of rancid English cheese, and drinking two or three glasses of port wine every day. She would in no instance eat bread with the cheese, nor taste the wine, if it was mixed with water.

We sometimes see relief given by the use of the warm bath, in cases of obstinate pain. The bath is more effectual, if warm wine is used, instead of water.

I have had but few opportunities of trying the effects of cold water applied to the body in this disease; but from the benefit which attended its use in the cases in which it was prescribed, I am disposed to believe that it would do great service, could we overcome the prejudices which subsist in the minds of parents against it.

After all that has been said in favour of the remedies that have been mentioned, I am sorry to add, that I have very often seen them all administered without effect. My principal dependence, therefore, for many years, has been placed upon

VII. Country air. Out of many hundred children whom I have sent into the country, in every stage of this

disease, I have lost but three ; two of whom were sent, contrary to my advice, into that unhealthy part of the neighbourhood of Philadelphia called the *Neck*, which lies between the city and the conflux of the rivers Delaware and Schuylkill. I have seen one cure performed by this remedy, after convulsions had taken place. To derive the utmost benefit from the country air, children should be carried out on horseback, or in a carriage every day ; and they should be exposed to the open air as much as possible in fair weather, in the day time. Where the convenience of the constant benefit of country air cannot be obtained, I have seen evident advantages from taking children out of the city once or twice a day. It is extremely agreeable to see the little sufferers revive as soon as they escape from the city air, and inspire the pure air of the country.

I shall conclude this inquiry by recommending the following methods of preventing this disease, all of which have been found, by experience to be useful.

1. The daily use of the cold bath.
2. A faithful and attentive accommodation of the dresses of children to the state and changes of the air.
3. A moderatē quantity of salted meat taken occasionally in those months in which the disease usually prevails. It is perhaps in part from the daily use of salted meat in diet, that the children of country people escape this disease.
4. The use of sound old wine in the summer months. From a tea spoon full, to half a wine glass full according to the age of the child, may be given every day. It is remarkable, that the children of persons in easy circumstances, who sip occasionally with their parents the remains of a glass of wine after dinner, are much less subject to this disease, than the children of poor people, who are without the benefit of that article of diet.
5. Cleanliness, both with respect to the skin and clothing of children. Perhaps the neglect of this direction may be another reason why the children of the poor are most subject to this disease.

6. The removal of children into the country before the approach of warm weather. This advice is peculiarly necessary during the whole period of dentition. I have never known but one instance of a child being affected by this disease, who had been carried into the country in order to avoid it.

I have only to add to the above observations, that since the prevalence of the yellow fever in Philadelphia after the year 1793, the cholera infantum has assumed symptoms of such malignity, as to require bleeding to cure it. In some cases, two and three bleedings were necessary for that purpose.

OBSERVATIONS
ON THE
CYNANCHE TRACHEALIS.

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ON THE

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THE vulgar name of this disease in Pennsylvania is **HIVES**. It is a corruption of the word *heaves*, which took its rise from the manner in which the lungs heave in breathing. The worst degree of the disease is called the **BOWEL HIVES**, from the great motion of the abdominal muscles in respiration.

It has been called *suffocatio stridula* by Dr. Home, and *cynanche trachealis* by Dr. Cullen. Professor Frank calls it *trachitis*, and Dr. Darwin considers it as a pleurisy of the windpipe. By the two latter names, the authors mean to convey the correct idea, that the disease is the same in its nature with the common diseases of other internal parts of the body.

It is brought on by the same causes which induce fever, particularly by cold. I have seen it accompany as well as succeed, the small-pox, measles, scarlet-fever, and aphthous sore throat. In the late Dr. Foulke it succeeded acute rheumatism. The late Dr Sayre informed me, he had seen it occur in a case of yellow fever, in the year 1798.

It sometimes comes on suddenly, but it more frequently creeps on in the form of a common cold. Its symptoms are sometimes constant, but they more generally remit, particularly during the day. It attacks children of all ages, from three months to five years old. But it occasionally attacks adults. It generally runs its course in three or four days, but we now and then see it

protracted, in a chronic and feeble form, for eight and ten days.

Dissection show the following appearances in the trachea.

1. A slight degree of inflammation.
2. A thick matter resembling mucus.
3. A membrane similar to that which succeeds inflammation in the pleura and bowels, formed from the coagulating lymph of the blood.
4. In some cases the trachea exhibits no marks of disease of any kind. These cases are generally violent, and terminate suddenly. The morbid excitement here transcends inflammation. Similar instances of the absence of the common signs of disease, after death, occur in other parts of the body. Where the cynanche trachealis has appeared in the high grade which has been last mentioned, it has been called spasmodic. Where the serous vessels of the trachea have been tinged with red blood, it has been considered as inflammatory. Where a liquid matter has been found in the trachea, it has been called humoral; and where a membrane has been seen adhering to the trachea, it has received from Dr. Michaelis the name of angina polyposa. But all these different issues of the cynanche trachealis are the effects of a difference only in its force, or in its duration: they all depend upon one remote, and one proximate cause.

In the *forming* state of this disease, which may be easily known by a hoarseness, and a slight degree of stertorous cough, a puke of antimonial wine, tartar emetic ipecacuanha, or oxymel of squills, is for the most part an immediate cure. To be effectual, it should operate four or five times. Happily children are seldom injured by a little excess in the operation of this class of medicines. I have prevented the formation of this disease many hundred times, and frequently in my own family by means of this remedy.

After the disease is completely formed, and appears with the usual symptoms described by authors, the remedies should be

1. Blood-letting. The late Dr. Bailie of New York used to bleed until fainting was induced. His practice has been followed by Dr. Dick of Alexandria, and with great success. I have generally preferred small, but frequent, to copious bleedings. I once drew twelve ounces of blood, at four bleedings, in one day, from a son of Mr. John Carrol, then

in the fourth year of his age. Dr. Physick bled a child, of but three months old, three times in one day. Life was saved in both these cases. Powerful as the lancet is, in this disease, its violence and danger require that it should be aided by

2. Vomits. These should be given every day, or oftener, during the continuance of the disease. Their good effects are much more obvious and certain in a disease of the trachea, than of the lungs, and hence their greater utility, as I shall say hereafter, in a consumption from a catarrh, than from any other of its causes.

3. Purges. These should consist of calomel and jalap, or rhubarb, and should always follow the use of emetics, if they fail of opening the bowels.

4. Calomel should likewise be given in large doses. Dr. Physick gave half a drachm of this medicine, in one day, to the infant whose case has been mentioned. I have never known it excite a salivation when given to children whose ages render them subjects of it, probably because it has been given in such large quantities as to pass rapidly through the bowels. Its good effects seem to depend upon its exciting a counter-action in the whole intestinal canal, and thereby lessening the disposition of the tracheal blood-vessels to discharge the mucus, or form the membrane, which have been described.

5. Blisters should be applied to the throat, breast, and neck, and even to the limbs.

6. Dr. Archer of Maryland commends, in high terms, the use of polygala, or Seneca snake-root, in this disease. I can say nothing in favour of its exclusive use, from my own experience, having never given it, but as an auxiliary to other remedies.

7. I have seen great relief given by the use of the warm bath, especially when it has been followed by a gentle perspiration.

8. Towards the close of the disease, after the symptoms of great morbid action begin to decline, a few drops of liquid laudanum, by quieting the cough which generally succeeds it, often produce the most salutary effects. They should be given in flaxseed, or bran, or onion tea, of which drinks the patient should drink freely in every stage of the disease.

The *cynanche trachealis* is attended with most danger, when the patient labours under a *constant* and audible stertorous breathing. The danger is less, when a dry stertorous cough attends, with *easy* respiration in its intervals. The danger is nearly over when the cough, though stertorous, is *loose*, and accompanied with a *discharge* of mucus from the trachea.

An eruption of little red blotches, which frequently appears and disappears two or three times in the course of this disease, is always a favourable symptom.

I once attended a man from Virginia of the name of Bampfield, who, after an attack of this disease, was much distressed with the stertorous breathing and cough which belong to it. I suspected both to arise from a membrane formed by inflammation in his trachea. This membrane I supposed to be in part detached from the trachea, from the rattling noise which attended his breathing. He had used many remedies for it to no purpose. I advised a salivation, which in less than three weeks perfectly cured him.

Since the general adoption of the remedies which have been enumerated, for the *cynanche trachealis*, instances of its mortality have become very uncommon in the city of Philadelphia.

AN ACCOUNT
OF THE
BILIOUS REMITTING FEVER,
AS IT
APPEARED IN PHILADELPHIA
IN THE SUMMER AND AUTUMN OF THE YEAR 1780.

(see also sim title for - - 1793)

AN ACCOUNT

OF THE

BILIOUS REMITTING FEVER, &c.

BEFORE I proceed to describe this fever, it will be necessary to give a short account of the weather, and of the diseases which preceded its appearance.

The spring of 1780 was dry and cool. A catarrh appeared among children between one year and seven years of age. It was accompanied by a defluxion from the eyes and nose, and by a cough and dyspnœa, resembling, in some instances, the cynanche trachealis and in others a peripneumony. In some cases it was complicated with the symptoms of a bilious remitting and intermitting fever. The exacerbations of this fever were always attended with dyspnœa and cough. A few patients expectorated blood. Some had swellings behind their ears, and others were affected with small ulcers in the throat. I met with only one case of this fever in which the pulse indicated bleeding. The rest yielded in a few days to emetics, blisters, and the bark, assisted by the usual more simple remedies in such diseases.

An intermittent prevailed among adults in the month of May.

July and August were uncommonly warm. The mercury stood on the 6th of August at $94\frac{1}{2}$, on the 15th of the same month at 95° , and for several days afterwards at 90° . Many labouring people perished during this month by the heat, and by drinking, not only cold water but cold liquors of several kinds, while they were under the violent impressions of the heat.

The vomiting and purging prevailed universally during these two warm months, among the children, and with uncommon degrees of mortality. Children from one year

to eight and nine years old were likewise very generally affected by blotches and little boils, especially in their faces. An eruption on the skin, called by the common people the prickly heat, was very common at this time among persons of all ages. The winds during these months blew chiefly from the south, and south-west. Of course they passed over the land which lies between the city, and the conflux of the rivers Delaware and Schuylkill, the peculiar situation of which, at that time, has been already described.

The dock, and the streets of Philadelphia, supplied the winds at this season, likewise, with a portion of their unwholesome exhalations.

The moschettoes were uncommonly numerous during the autumn. A certain sign (says Dr. Lind) of an unwholesome atmosphere.

The remitting fever made its first appearance in July and August, but the symptoms were so mild, and its extent so confined, that it excited no apprehensions of its subsequent more general prevalence throughout the city.

On the 19th of August the air became suddenly very cool. Many hundred people in the city complained, the next day, of different degrees of indisposition, from a sense of lassitude to a fever of the remitting type. This was the signal of the epidemic. The weather continued cool during the remaining part of the month, and during the whole month of September. From the exposure of the district of Southwark (which is often distinguished by the name of the *Hill*) to the south-west winds the fever made its first appearance in that appendage of the city. Scarcely a family, and in many families, scarcely a member of them, escaped it. From the Hill it gradually travelled along the second street from the Delaware, improperly called Front-street. For a while it was confined to this street only, after it entered the city, and hence it was called by some people the *Front-Street fever*. It gradually spread through other parts of the city, but with very different degrees of violence. It prevailed but little in the Northern Liberties. It was scarcely known beyond Fourth-Street from the Delaware. Intemperance in eating or drinking, riding in the sun or rain, watching,

fatigue or even a fright, but more frequently cold, all served to excite the seeds of this fever into action, wherever they existed.

All ages and both sexes were affected by this fever. Seven of the practitioners of physic were confined by it nearly at the same time. The city during the prevalence of the fever was filled with an unusual number of strangers, many of whom, particularly the Friends (whose yearly meeting was held in the month of September,) were affected by it. No other febrile disease was observed during this time in the city.

This fever generally came on with rigor but seldom with a regular chilly fit, and often without any sensation of cold. In some persons it was introduced by a slight sore throat, and in others by a hoarseness which was mistaken for a common cold. A giddiness in the head was the forerunner of the disease in some people. This giddiness attacked so suddenly, as to produce, in several instances a faintness, and even symptoms of apoplexy. It was remarkable that all those persons who were affected in this violent manner recovered in two or three days.

I met with one instance of this fever attacking with coma, and another with convulsions, and with many instances, in which it was introduced by a delirium.

The pains which accompanied this fever were exquisitely severe in the head, back, and limbs. The pains in the head were sometimes in the back parts of it, and at other times they occupied only the eyeballs. In some people the pains were so acute in their backs and hips, that they could not lie in bed. In others, the pains affected the neck and arms, so as to produce in one instance a difficulty of moving the fingers of the right hand. They all complained more or less of a soreness in the seats of these pains, particularly when they occupied the head and eyeballs. A few complained of their flesh being sore to the touch, in every part of the body. From these circumstances, the disease was sometimes believed to be a rheumatism; but its more general name among all classes of people was, the *break-bone fever*.

I met with one case of pain in the back, and another of an

acute ear-ach, both of which returned periodically every night, and without any fever.

A nausea universally, and in some instances a vomiting, accompanied by a disagreeable taste in the mouth, attended this fever. The bowels were, in most cases regular, except where the disease fell with its whole force upon them, producing a dysentery.

The tongue was generally moist, and tinctured of a yellow colour.

The urine was high coloured, and in its usual quantity in fevers.

The skin was generally moist, especially where the disease terminated on the third or fourth day.

The pulse was quick and full, but never hard, in a single patient that came under my care, till the 28th of September.

It was remarkable, that little, and, in some instances, no thirst attended this fever.

A screatus or constant hawking and spitting, attended in many cases through the whole disease, and was a favourable symptom.

There were generally remissions in this fever every morning, and sometimes in the evening. The exacerbations were more severe every other day, and two exacerbations were often observed in one day.

A rash often appeared on the third and fourth days, which proved favourable. This rash was accompanied, in some cases, by a burning in the palms of the hands, and soles of the feet. Many people at this time, who were not confined to their beds, and some who had no fever had an efflorescence on their skins.

In several persons the force of the disease seemed to fall upon the face, producing swellings under the jaw and in the ears, which in some instances terminated in abscesses.

When the fever did not terminate on the third or fourth day, it frequently ran on to the eleventh, fourteenth, and even twentieth days, assuming in its progress, according to its duration, the usual symptoms of the typhus gravior, or mitior, of Doctor Cullen. In some cases, the discharge of a few spoons-full of blood from

the nose accompanied a solution of the fever on the third or fourth day ; while in others, a profuse hæmorrhage from the nose, mouth, and bowels, on the tenth and eleventh days, preceded a fatal issue of the disease.

Several cases came under my care, in which the fever was succeeded by a jaundice.

The disease terminated in some cases without sweating or sediment in the urine ; nor did I observe such patients more disposed to relapse than others provided they took a sufficient quantity of the bark.

About the beginning of October the weather became cool, accompanied by rain and an easterly wind. This cool and wet weather continued for four days. The mercury in the thermometer fell to 60°, and fires became agreeable. From this time the fever evidently declined, or was accompanied by inflammatory symptoms. On the 16th of October, I met with a case of inflammatory angina ; and on the next day I visited a patient who had a complication of the bilious fever with a pleurisy, and whose blood discovered strong marks of the presence of the inflammatory diathesis. His stools were of a green and black colour. On the third day of his disease a rash appeared on his skin, and on the fourth, in consequence of a second bleeding, his fever terminated with the common symptoms of a crisis.

During the latter end of October, and the first weeks in November, the mercury in the thermometer fluctuated between 50 and 60°. Pleurisies and inflammatory diseases of all kinds now made their appearance. They were more numerous and more acute, than in this stage of the autumn, in former years. I met with one case of pleurisy in November, which did not yield to less than four plentiful bleedings.

I shall now add a short account of the METHOD I pursued in the treatment of this fever.

I generally began by giving a gentle vomit of tartar emetic. This medicine, if given while the fever was in its forming state, frequently produced an immediate cure ; and if given after its formation, on the *first* day, seldom failed of producing a crisis on the third or fourth day. The vomit always discharged more or less bile. If a

nausea, or an ineffectual attempt to vomit continued after the exhibition of the tartar emetic, I gave a second dose of it with the happiest effects.

If the vomit failed of opening the bowels, I gave gentle doses of salts and cream of tartar,* or of the butter-nut pill,† so as to procure two or three plentiful stools,

The matter discharged from the bowels was of a highly bilious nature. It was sometimes so acrid as to excoriate the rectum, and so offensive, as to occasion, in some cases, sickness and faintness both in the patients and in their attendants. In every instance the patients found relief by these evacuations, especially from the pains in the head and limbs.

In those cases, where the prejudices of the patients against an emetic, or where an advanced stage of pregnancy, or a habitual predisposition to a vomiting of blood occurred, I discharged the bile entirely by means of the lenient purges that have been mentioned. In this practice I had the example of Doctor Cleghorn, who prescribed purges with great success in a fever of the same kind in Minorca, with that which has been described.‡ Doctor Lining prescribed purges with equal success in an autumnal pleurisy in South Carolina, which I take to have been a form of a bilious remittent, accompanied by an inflammatory affection of the breast.

After evacuating the contents of the stomach and bowels, I gave small doses of tartar emetic, mixed with Glauber's salt. This medicine excited a general perspiration. It likewise kept the bowels gently open, by which means the bile was discharged as fast as it was accumulated.

I constantly recommended to my patients, in this stage of the disorder to *lie in bed*. This favoured the eruption of the rash, and the solution of the disease by perspira-

* I have found that cream of tartar renders the purging neutral salts less disagreeable to the taste and stomach; but accident has lately taught me, that the juice of two limes or of one lemon, with about half an ounce of loaf sugar, added to six drachms of Glauber's or Epsom salt in half a pint of boiling water, form a mixture that is nearly as pleasant as strong beverage.

† This pill is made from an extract of a strong decoction of the inner bark of the white walnut tree.

‡ The *tertiana interposita remissione tantum* of Dr. Cullen.

tion. Persons who struggled against the fever by *sitting up*, or who attempted to shake it off by labour or exercise, either sunk under it, or had a slow recovery.

A clergyman of a respectable character from the country, who was attacked by the disease in the city, returned home, from a desire of being attended by his own family, and died in a few days afterwards. This is only one, of many cases, in which I have observed travelling, even in the easiest carriages, to prove fatal in fevers after they were formed, or after the first symptoms had shown themselves. The quickest and most effectual way of conquering a fever, in most cases, is, by an early submission to it.

The drinks I recommended to my patients were sage and balm teas, weak punch, lemonade, wine whey, tamarind and apple water.

The apple-water should be made by pouring boiling water upon slices of raw apples. It is more lively than that which is made by pouring the water on roasted apples.

I found obvious advantages, in many cases, from the use of pediluvia every night.

In every case, I found the patients refreshed and relieved by frequent changes of their linen.

On the third or fourth day, in the forenoon, the pains in the head and back generally abated, with a sweat which was diffused over the whole body. The pulse at this time remained quick and weak. This was, however, no objection to the use of the bark, a few doses of which immediately abated its quickness, and prevented a return of the fever.

If the fever continued beyond the third or fourth day without an intermission, I always had recourse to blisters. Those which were applied to the neck, and behind the ears, produced the most immediate good effects. They seldom failed of producing an intermission in the fever, the day after they were applied. Where delirium or coma attended, I applied the blister to the neck on the *first* day of the disease. A worthy family in this city will always ascribe the life of a promising boy, of ten

years old, to the early application of a blister to the neck, in this fever.

Where the fever did not yield to blisters, and assumed malignant or typhus symptoms, I gave the medicines usually exhibited in both those states of fever.

I took notice, in the history of this fever, that it was sometimes accompanied with symptoms of a dysentery. Where this disease appeared, I prescribed lenient purges and opiates. Where these failed of success, I gave the bark in the intermissions of the pain in the bowels, and applied blisters to the wrists. The good effects of these remedies led me to conclude, that the dysentery was the *febris introversa* of Dr. Sydenham.

I am happy in having an opportunity, in this place, of bearing a testimony in favour of the usefulness of OPIUM in this disease, after the necessary evacuations had been made. I yielded, in prescribing it at first, to the earnest solicitations of my patients for something to give them relief from their insupportable pains, particularly when they were seated in the eyeballs and head. Its salutary effects in procuring sweat, and a remission of the fever, led me to prescribe it afterwards in almost every case, and always with the happiest effects. Those physicians enjoy but little pleasure in practising physic, who know not how much of the pain and anguish of fevers of a certain kind, may be lessened by the judicious use of opium.

In treating of the remedies used in this disease, I have taken no notice of blood-letting. Out of several hundred patients whom I visited in this fever, I did not meet with a single case, before the 27th of September, in which the state of the pulse indicated this evacuation. It is true, the pulse was *full*, but never *hard*. I acknowledge that I was called to several patients who had been bled without the advice of a physician, who recovered afterwards on the usual days of the solution of the fever. This only can be ascribed to that disposition which Dr. Cleghorn attributes to fevers, to preserve their types under every variety of treatment, as well as constitution. But I am bound to declare further, that I heard of several cases in which bleeding was followed by a fatal termination of the disease.

In this fever relapses were very frequent from exposure to the rain, sun, or night air, and from an excess in eating or drinking.

The convalescence from this disease was marked by a number of extraordinary symptoms, which rendered patients the subjects of medical attention for many days after the pulse became perfectly regular, and after the crisis of the disease.

A bitter taste in the mouth, accompanied by a yellow colour on the tongue, continued for near a week.

Most of those who recovered complained of nausea, and a total want of appetite. A faintness, especially upon sitting up in bed, or in a chair, followed this fever. A weakness in the knees was universal. I met with two patients, who were most sensible of this weakness in the right knee. An inflammation in one eye, and in some instances in both eyes, occurred in several patients after their recovery.

But the most remarkable symptom of the convalescence from this fever, was an uncommon dejection of the spirits. I attended two young ladies, who shed tears while they vented their complaints of their sickness and weakness. One of them very aptly proposed to me to change the name of the disease, and to call it, in its present stage, instead of the break-bone the *break-heart fever*.

To remove these symptoms, I gave the tincture of bark and elixir of vitriol in frequent doses. I likewise recommended the plentiful use of ripe fruits; but I saw the best effects from temperate meals of oysters, and a liberal use of porter. To these was added, gentle exercise in the open air, which gradually completed the cure.

AN ACCOUNT
OF THE
SCARLATINA ANGINOSA,
AS IT
APPEARED IN PHILADELPHIA,
IN THE YEARS 1783 AND 1784.

AN ACCOUNT
OF THE
SCARLATINA ANGINOSA.

THE beginning of the month of July was unusually cool; insomuch that the mercury in Fahrenheit's thermometer stood at 61° in the day time, and fires were very comfortable, especially in the evening. In the last week but one of this month, the weather suddenly became so warm, that the mercury rose to $94\frac{1}{2}^{\circ}$, at which it remained for three days. As this heat was accompanied by no breeze from any quarter, the sense of it was extremely distressing to many people. Upwards of twenty persons died in the course of those three days, from the excess of the heat, and from drinking cold water. Three old people died suddenly within this space of time. This extreme heat was succeeded by cool weather, the mercury having fallen to 60° , and the month closed with producing a few intermitting and remitting fevers, together with several cases of inflammatory angina.

The weather in the month of August was extremely variable. The mercury, after standing for several days at 92° , suddenly fell so low, as not only to render fires necessary, but in many places to produce frost.

Every form of fever made its appearance in this month. The synocha was so acute, in several cases, as to require from three to four bleedings. The remitting fever was accompanied by an uncommon degree of nausea and faintness. Several people died, after a few days illness, of the malignant bilious fever or typhus gravior, of Dr. Cullen. The intermittents had nothing peculiar in them, in their symptoms or method of cure.

Towards the close of the month, the scarlatina anginosa made its appearance, chiefly among children.

The month of September was cool and dry, and the scarlatina anginosa became epidemic among adults as well as young people. In most of the patients who were affected by it, it came on with a chilliness and a sickness at the stomach, or a vomiting; which last was so invariably present, that it was with me a pathognomonic sign of the disease. The matter discharged from the stomach was always bile. The swelling of the throat was in some instances so great, as to produce a difficulty of speaking, swallowing, and breathing. In a few instances, the speech was accompanied by a squeaking voice, resembling that which attends the cynanche trachealis. The ulcers on the tonsils were deep, and covered with white, and, in some instances, with black sloughs. In several cases, there was a discharge of a thick mucus from the nose, from the beginning, but it oftener occurred in the decline of the disease, which most frequently happened on the fifth day. Sometimes the subsiding of the swelling of the throat was followed by a swelling behind the ears.

An eruption on the skin generally attended the symptoms which have been described. But this symptom appeared with considerable variety. In some people it preceded, and in others it followed the ulcers and swelling of the throat. In some, it appeared only on the outside of the throat, and on the breast; in others, it appeared chiefly on the limbs. In a few it appeared on the second or third day of the disease, and never returned afterwards. I saw two cases of eruption without a single symptom of sore throat. The face of one of those patients was swelled, as in the erysipelas. In the other, a young girl of seven years old, there was only a slight redness on the skin. She was seized with a vomiting, and died delirious in fifty-four hours. Soon after her death, a livid colour appeared on the outside of her throat.

The bowels, in this degree of the disease, were in general regular. I can recollect but few cases which were attended by a diarrhœa.

The fever which accompanied the disease was generally the typhus mitior of Dr. Cullen. In a few cases it assumed symptoms of great malignity.

The disease frequently went off with a swelling of the hands and feet. I saw one instance in a gentlewoman, in whom this swelling was absent, who complained of very acute pains in her limbs, resembling those of the rheumatism.

In two cases which terminated fatally, there were large abscesses; the one on the outside, and the other on the inside of the throat. The first of these cases was accompanied by troublesome sores on the ends of the fingers. One of these patients lived twenty-eight, and the other above thirty days, and both appeared to die from the discharge which followed the opening of their abscesses.

Between the degrees of the disease which I have described, there were many intermediate degrees of indisposition which belonged to this disease.

I saw in several cases a discharge from behind the ears, and from the nose, with a slight eruption, and no sore throat. All these patients were able to sit up, and walk about.

I saw one instance of a discharge from the inside of one of the ears in a child, who had ulcers in his throat, and the squeaking voice.

In some, a pain in the jaw, with swellings behind the ears, and a slight fever, constituted the whole of the disease.

In one case the disease came on with a coma, and in several patients it went off with this symptom.

A few instances occurred of adults, who walked about and even transacted business, until a few hours before they died.

The intermitting fever, which made its appearance in August, was not lost during the month of September. It continued to prevail, but with several peculiar symptoms. In many persons it was accompanied by an eruption on the skin, and a swelling of the hands and feet. In some, it was attended by a sore throat and pains behind the ears. Indeed, such was the predominance of the scarlatina anginosa, that many hundred people complained of sore throats, without any other symptom of indisposition. The slightest occasional or exciting cause, particularly cold, seldom failed of producing the disease.

The month of October was much cooler than September, and the disease continued, but with less alarming symptoms. In several adults, who were seized with it, the hardness of the pulse indicated blood-letting. The blood in one case, was covered with a buffy coat, but beneath its surface it was dissolved.

In the month of November, the disease assumed several inflammatory symptoms, and was attended with much less danger than formerly. I visited one patient whose symptoms were so inflammatory as to require two bleedings. During the decline of the disease, many people complained of troublesome sores on the ends of their fingers. A number of children likewise had sore throats and fevers, with eruptions on their skin, which resembled the chicken-pox. I am disposed to suspect that this eruption was the effect of a spice of the scarlatina anginosa, as several instances occurred of patients who had all the symptoms of this disease, in whom an eruption of white blisters succeeded their recovery. This form of the disease has been called by Sauvage, the scarlatina variolosa.

I saw one case of sore throat, which was succeeded not only by swelling, in the abdomen and limbs, but by a catarrh, which brought on a fatal consumption.

A considerable shock of an earthquake was felt on the 29th of this month, at ten o'clock at night, in the city of Philadelphia; but no change was perceived in the disease, in consequence of it.

In December, January, and February, the weather was intensely cold. There was a thaw for a few days in January, which broke the ice of the Delaware but it was followed by cold so excessive, as to close the river till the beginning of March. The mercury, on the 28th and 29th of February, stood below 0 in Fahrenheit's thermometer.

For a few weeks in the beginning of December, the disease disappeared in the circle of my patients, but it broke out with great violence the latter end of that month, and in the January following. Some of the worst cases that I met with (three of which proved fatal) were in those two months.

The disease disappeared in the spring, but it spread

afterwards through the neighbouring states of New-Jersey, Delaware, and Maryland.

I shall now add an account of the remedies which I administered in this disease.

In every case that I was called to, I began the cure by giving a vomit joined with calomel. The vomit was either tartar emetic or ipecacuanha, according to the prejudices, habits, or constitutions of my patients. A quantity of bile was generally discharged by this medicine. Besides evacuating the contents of the stomach, it cleansed the throat in its passage downwards. To insure this effect from the calomel, I always directed it to be given mixed with syrup or sugar and water so as to diffuse it generally over every part of the throat. The calomel seldom failed to produce two or three stools. In several cases I was obliged, by the continuance of nausea, to repeat the emetics, and always with immediate and obvious advantage. I gave the calomel in moderate doses in every stage of the disease. To restrain its purgative effects, when necessary, I added to it a small quantity of opium.

During the whole course of the disease, where the calomel failed of opening the bowels, I gave lenient purges, when a disposition to costiveness required them.

The throat was kept clean by detergent gargles. In several instances I saw evident advantages from adding a few grains of calomel to them. In cases of great difficulty of swallowing or breathing, the patients found relief from receiving the steams of warm water mixed with a little vinegar, through a funnel into the throat.

A perspiration kept up by gentle doses of antimonials, and diluting drinks, impregnated with wine, always gave relief.

In every case which did not yield to the above remedies on the third day, I applied a blister behind each ear, or one to the neck, and, I think, always with good effects.

I met with no cases in which the bark appeared to be indicated, except the three in which the disease proved fatal. Where the sore throat was blended with the intermitting fever, the bark was given with advantage. But in

common cases it was unnecessary. Subsequent observations have led me to believe, with Doctor Withering, that it is sometimes hurtful in this disease.

It proved fatal in many parts of the country, upon its first appearance; but wherever the mode of treatment here delivered was adopted, its mortality was soon checked. The calomel was used very generally in New Jersey and New-York. In the Delaware state, a physician of character made it a practice not only to give calomel, but to anoint the outside of the throat with mercurial ointment.

ADDITIONAL OBSERVATIONS

UPON THE

SCARLATINA ANGINOSA.

THIS disease had prevailed in Philadelphia, at different seasons, ever since the year 1783. It has blended itself occasionally with all our epidemics. Many cases have come under my notice since its first appearance, in which dropsical swellings have succeeded the fever. In some instances there appeared to be effusions of water not only in the limbs and abdomen, but in the thorax. They yielded, in every case that I attended, to purges of calomel and jalap. Where these swellings were neglected, they sometimes proved fatal.

In the winter of 1786-7, the scarlatina anginosa was blended with the cynanche parotideæ, and in one instance with a typhus mitior. The last was in a young girl of nine years of age. She was seized with a vomiting of bile and an efflorescence on her breast, but discovered no other symptoms of the scarlatina anginosa till the sixteenth day of her fever, when a swelling appeared on the outside of her throat, and after her recovery, a pain and swelling in one of her knees.

In the month of July, 1787, a number of people were affected by sudden swellings of their lips and eyelids. These swellings generally came on in the night, were attended with little or no pain, and went off in two or three days. I met with only one case in which there was a different issue to these symptoms. It was in a patient in the Pennsylvania hospital, in whom a swelling in the lips ended in a suppuration, which, notwithstanding the

liberal use of bark and wine, proved fatal in the course of twelve days.

In the months of June and July, 1788, a number of people were affected by sudden swellings, not only of the lips, but of the cheeks and throat. At the same time many persons were affected by an inflammation of the eyes. The swellings were attended with more pain than they were the year before, and some of them required one or two purges to remove them; but in general they went off without medicine, in two or three days.

Is it proper to refer these complaints to the same cause which produces the scarlatina anginosa?

The prevalence of the scarlatina anginosa at the same time in this city; its disposition to produce swellings in different parts of the body; and the analogy of the intermitting fever, which often conceals itself under symptoms that are foreign to its usual type; all seem to render this conjecture probable. In one of the cases of an inflammation of the eye, which came under my notice, the patient was affected by vomiting a few hours before the inflammation appeared, and complained of a sickness at his stomach for two or three days afterwards. Now a vomiting and nausea appear to be very generally symptoms of the scarlatina anginosa.

In the autumn of 1788, the scarlatina anginosa appeared with different degrees of violence in many parts of the city. In two instances it appeared with an obstinate diarrhoea; but it was in young subjects, and not in adults as described by Dr. Withering. In both cases, the disease proved fatal; the one on the third, the other on the fifth day.

In the month of December of the same year, I saw one case in which a running from one of the ears, and a deafness came on, on the fifth day, immediately after the discharge of mucus from the nose had ceased. This case terminated favourably on the ninth day; but was succeeded, for several days afterwards by a troublesome cough.

I shall conclude this essay by the following remarks:

1. Camphor has often been suspended in a bag from the neck, as a preservative against this disease. Repeated

observations have taught me, that it possesses little or no efficacy for this purpose. I have had reason to entertain a more favourable opinion of the benefit of washing the hands and face with vinegar, and of rinsing the mouth and throat with vinegar and water every morning, as means of preventing this disease.

2. Whenever I have been called to a patient where the scarlatina appeared to be in a *forming* state, a vomit of ipecacuannha or tartar emetic, mixed with a few grains of calomel, has never failed of completely checking the disease, or of so far mitigating its violence, as to dispose it to a favourable issue in a few days ; and if these observations should serve no other purpose than to awaken the early attention of patients and physicians to this speedy and effectual remedy, they will not have been recorded in vain.

3. When the matter which produces this disease has been received into the body, a purge has prevented its being excited into action, or rendered it mild, throughout a whole family. For this practice I am indebted to some observations on the scarlatina, published by Dr. Sims in the first volume of the Medical Memoirs.

4. During the prevalence of the inflammatory constitution of the atmosphere, between the years 1793 and 1800, this disease occurred occasionally in Philadelphia, and yielded, like the other epidemics of those years, to copious blood-letting, and other depleting remedies.

AN ACCOUNT
OF
THE MEASLES,
AS THEY
APPEARED IN PHILADELPHIA,
IN THE SPRING OF 1789.

AN ACCOUNT, &c.

THE weather in December, 1788, and in January, 1789, was variable, but seldom very cold. On the first of February, 1789, at six o'clock in the morning, the mercury in Fahrenheit's thermometer fell 5 below 0, in the city of Philadelphia. At twenty miles from the city, on the Schuylkill, it fell 12 below 0, at the same hour. On the 19th and 20th of this month, there fell a quantity of snow, the depth of which, upon an average, was supposed to be about eight or ten inches. On the 23d, 24th, 25th, and 27th the weather was very cold. The mercury fluctuated during these three days between 4° and 10° above 0.

In the intervals between these cold days, the weather frequently moderated, so that the Delaware was frozen and thawed not less than four times. It was not navigable till the 8th of March. There were in all, during the winter and month of March, sixteen distinct falls of snow.

In April and May there were a few warm days; but upon the whole, it was a very cold and backward spring. The peaches failed almost universally. There were no strawberries or cherries on the 24th of May, and every other vegetable product was equally backward. A country woman of 84 years of age informed me, that it was the coldest spring she had ever known. It was uncomfortable to sit without fire till the first of June.

The measles appeared first in the Northern Liberties, in December. They spread slowly in January, and were not universal in the city till February and March.

This disease, like many others, had its *precursor*. It was either a gum boil, or a sore on the tongue. They were both very common but not universal. They occurred, in some instances, several days before the fever, but

in general they made their appearance during the eruptive fever, and were a sure mark of the approaching eruption of the measles. I was first led to observe this fact, from having read Dr. Quin's accurate account of the measles in Jamaica. I shall now proceed to mention the symptoms of the measles as they appeared in the different parts of the body.

1. In the *head*, they produced great pain, swelling of the eye-lids, so as to obstruct the eye-sight, tooth-ach, bleeding at the nose, tinitus aurium, and deafness; also coma for two days, and convulsions. I saw the last symptom only in one instance. It was brought on by a stoppage of a running from the ear.

2. In the *throat* and *lungs*, they produced a soreness and hoarseness, acute or dull pains in the breast and sides, and a painful or distressing cough. In one case this cough continued for two hours without any intermission, attended by a copious expectoration. In two cases, I saw a constant involuntary discharge of phlegm and mucus from the mouth, without any cough. One of them terminated fatally. Spitting of blood occurred in several instances. The symptoms of pneumonia vera notha and typhoides were very common. I saw two fatal cases from pneumonia notha, in both of which the patients died with the trunk of the body in an erect posture. I met with two cases in which there was no cough till the eruption made its appearance on the fourth day, and one which was accompanied by all the usual symptoms of the cynanche trachealis.

3. In the *stomach* the measles produced in many instances, sickness and vomiting. And

4. In the *bowels*, griping, diarrhœa, and in some instances, bloody stools. The diarrhœa occurred in every stage of the disease, but it was bloody and most painful in its decline. I attended a black girl who discharged a great many worms, but without the least relief of any of her symptoms.

There was a great variety in this disease. 1. In the *time* of the attack of the fever, from the *time* of the reception of the contagion. In general the interval was four

teen days, but it frequently appeared before, and sometimes later than that period.

2. In the *time of the eruption*, from the beginning of the fever. It generally appeared on the third and fourth days. In one case, Dr. Waters informed me, it did not appear till the eighth day.

3. In the *abatement or continuance* of the fever after the eruption.

4. In the *colour and figure* of the eruption. In some it put on a *pale red*, in others a *deep*, and in a few a *livid* colour, resembling an incipient mortification. In some there appeared red blotches, in others an equally diffused redness, and in a few, eruptions like the small-pox called by Dr. Cullen, *rubiola varioloides*.

5. In the *duration* of the eruption on the skin. It remained in most cases only three or four days; but in one, which came under my care, it remained nine days.

6. In the *manner of its retrocession*. I saw very few cases of its leaving the branny appearance so generally spoken of by authors on the skin.

7. In *not affecting* many persons, and even families who were exposed to it.

The symptoms which continued in many after the retrocession of the measles, were cough, hoarseness, or complete aphonia, which continued in two cases for two weeks; also diarrhœa, ophthalmy, a bad taste in the mouth, a defect or excess of appetite, and a fever which in some instances, was of the intermittent kind, but which in more assumed the more dangerous form of the typhus mitior. Two cases of internal dropsy of the brain followed them. One was evidently excited by a fall. They both ended fatally.

During the prevalence of the disease I observed several persons (who had had the measles, and who were closely confined to the rooms of persons ill with them) to be affected with a slight cough, sore throat, and even sores in the mouth. I find a similar fact taken notice of by Dr. Quier.

But I observed further, many children to be affected by a fever, cough, and all the other symptoms of the measles which have been mentioned, except a general

eruption, for in some there was a trifling *efflorescence* about the neck and breast. I observed the same thing in 1773 and 1783. In my note book I find the following account of the appearance of this disease in children in the year 1773. "The measles appeared in March; a "catarrh" for by that name I then called it "appeared at the same time, and was often mistaken for them, the symptoms being nearly the same in both. In the catarrh there was in some instances a trifling eruption. A lax often attended it, and some who had it had an extremely "sore mouth."

I was the more struck with this disease, from finding it was taken notice of by Dr. Sydenham. He calls it a morbillious fever. I likewise find an account of it in the 2d article of the 5th volume of the Edinburgh Medical Essays. The words of the author, who is anonymous, are as follow. "During this measly season, several persons, who had never had the measles, had all the symptoms of measles, which went off in a few days without any eruptions. The same persons had the measles months or years afterwards." Is this disease a common fever, marked by the reigning epidemic, and produced in the same manner, and by the same causes, as the variolous fever described by Dr. Sydenham, which he says prevailed at the same time with the small pox? I think it is not. My reasons for this opinion are as follow.

1. I never saw it affect any but children, in the degree that has been mentioned, and such only as had never had the measles.

2. It affected whole families at the same time. It proved fatal to one of three children whom it affected on the same day.

3. It terminated in a pulmonary consumption in a boy of ten years old, with all the symptoms which attend that disease when it follows the regular measles.

4. It affected a child in one family, on the same day that two other members of the same family were effected by the genuine measles.

5. It appeared on the usual days of the genuine measles, from the time the persons affected by it were exposed to its contagion. And,

6. It communicated the disease in one family, in the usual time in which the disease is taken from the genuine measles.

The measles, then, appear to follow the analogy of the small-pox, which affects so superficially as to be taken a second time, and which produce on persons who have had them what are called the nurse pock. They follow likewise the analogy of another disease, viz. the scarlatina anginosa. In the account of the epidemic for 1773, published in the third volume of the Edinburgh Medical Essays, we are told, that such patients as had previously had the scarlet fever without sore throats, took the sore throat, and had no eruption, while those who had previously had the sore throat had a scarlet eruption, but the throat remained free from the distemper. All other persons who were affected had both.

From these facts, I have taken the liberty of calling it the *internal measles*, to distinguish it from those which are *external*. I think the discovery of this new state of this disease of some application to practice.

1. It will lead us to be cautious in declaring any disease to be the external measles, in which there is not a general eruption. From my ignorance of this, I have been led to commit several mistakes, which were dishonourable to the profession. I was called, during the prevalence of the measles in the above-named season, to visit a girl of twelve years old, with an eruption on the skin. I called it the measles. The mother told me it was impossible, for that I had in 1783 attended her for the same disease. I suspect the anonymous author before-mentioned has fallen into the same error. He adds to the account before quoted the following words. "Others who had undergone the measles formerly, had *at this time* a fever of the erysepeleatous kind, with eruptions like to which nettles cause, and all the *previous* and comitant symptoms of the measles, from the beginning to the end of the disease."

2. If inoculation, or any other mode of lessening the violence of the disease, should be adopted, it will be of consequence to know what persons are secure from the attacks of it, and who are still exposed to it.

I shall now add a short account of my method of treating this disease.

Many hundred families came through the disease without the help of a physician. But in many cases it was attended with peculiar danger, and in some with death. I think it was much more fatal than in the years 1773 and 1783, probably owing to the variable weather in the winter, and the coldness and dampness of the succeeding spring. Dr. Huxham says, he once saw the measles attended with peculiar mortality, during a late cold and damp spring in England. It was much more fatal (*cæteris paribus*) to adults than to young people.

The remedies I used were—

1. *Bleeding*, in all cases where great pain and cough, with a hard pulse attended. In some I found it necessary to repeat this remedy. But I met with many cases in which it was forbidden by the weakness of the pulse, and by other marks of a feeble action in the blood-vessels.

2. *Vomits*. These were very useful in removing a nausea; they likewise favoured the eruption of the measles.

3. *Demulcent and diluting drinks*. These were barley water, bran, and flaxseed tea, dried cherry and raw apple water, also beverage, and cider and water. The last drink I found to be the most agreeable to my patients of any that have been mentioned.

4. *Blisters* to the neck, sides, and extremities, according to the symptoms. They were useful in every stage of the disease.

5. *Opiates*. These were given not only at night, but in small doses during the day, when a troublesome cough or diarrhœa attended.

6. Where a catarrhal fever ensued, I used bleeding and blisters. In those cases in which this fever terminated in an intermittent, or in a mild typhus fever, I gave the bark with evident advantage. In that case of measles, formerly mentioned, which was accompanied by symptoms of cynanche trachealis, I gave calomel with the happiest effects. In the admission of *fresh air* I observed a medium as to its temperature, and accommodated it to the degrees of action in the system. In different

parts of the country, in Pennsylvania and New Jersey I heard with great pleasure of the *cold air* being used as freely and as successfully in this disease, as in the inflammatory small-pox. The same people who were so much benefited by *cool air*, I was informed, drank plentifully of cold water during every stage of the fever. One thing in favour of this country practice deserves to be mentioned, and that is, evident advantages arose in all the cases which I attended, from patients leaving their beds in the febrile state of this disease. But this was practised only by those in whom inflammatory diathesis prevailed, for these alone had strength enough to bear it.

The convalescent state of this disease required particular attention.

1. *A diarrhœa* often continued to be troublesome after other symptoms had abated. I relieved it by opiates and demulcent drinks. Bleeding has been recommended for it, but I did not find it necessary in a single case.

2. An *ophthalmia* which sometimes attended, yielded to astringent collyria and blisters.

3. Where a cough or fever followed so slight as not to require bleeding, I advised a milk and vegetable diet, country air, and moderate warmth; for whatever might have been the relation of the lungs in the beginning of the disease to cold air, they were now evidently too much debilitated to bear it.

4. It is a common practice to prescribe purges after the measles. After the asthenic state of this disease they certainly do harm. In all cases, the effects of them may be better obviated by diet, full or low, suitable clothing, and gentle exercise, or country air. I omitted them in several cases, and no eruption or disease of any kind followed their disuse.

I shall only add to this account of the measles, that in several families, saw evident advantages from preparing the body for the reception of the contagion, by means of a vegetable diet.

AN ACCOUNT
OF
THE INFLUENZA,
AS IT
APPEARED IN PHILADELPHIA,

IN THE AUTUMN OF 1789, IN THE SPRING OF 1790, AND IN THE WINTER OF 1791.

AN ACCOUNT, &c.

THE latter end of the month of August, in the summer of 1789, was so very cool that fires became agreeable. The month of September was cool, dry, and pleasant. During the whole of this month, and for some days before it began, and after it ended, there had been no rain. In the beginning of October, a number of the members of the first congress, that had assembled in New York, under the present national government, arrived in Philadelphia, much indisposed with colds. They ascribed them to the fatigue and night air to which they had been exposed in travelling in the public stages; but from the number of persons who were affected, from the uniformity of their complaints, and from the rapidity with which it spread through our city, it soon became evident that it was the disease so well known of late years by the name of the influenza.

The symptoms which ushered in the disease were generally a hoarseness, a sore throat, a sense of weariness, chills, and a fever. After the disease was formed, it affected more or less the following parts of the body. Many complained of acute pains in the *head*. These pains were frequently fixed between the eye-balls, and, in three cases which came under my notice, they were terminated by abscesses in the frontal sinus, which discharged themselves through the nose. The pain in one of these cases, before the rupture of the abscess, was so exquisite that my patient informed me that he felt as if he should lose his reason. Many complained of a great itching in the *eye-lids*. In some the eye-lids were swelled. In others, a copious effusion of water took place from the *eyes*; and in a few, there was a true ophthalmia.

Many complained of great pains in one *ear*, and some of pains in both *ears*. In some, these pains terminated in abscesses, which discharged for some days a bloody or purulent matter. In others, there was a swelling behind each ear, without a suppuration.—*Sneezing* was a universal symptom. In some, it occurred not less than fifty times in a day. The matter discharged from the nose was so acrid as to inflame the nostrils and the upper lip, in such a manner as to bring on swellings, sores, and scabs in many people. In some, the nose discharged drops, and in a few, streams of blood, to the amount in one case, of twenty ounces. In many cases it was so much obstructed, as to render breathing through it difficult. In some, there was a total defect of *taste*. In others, there was a bad taste in the mouth, which frequently continued through the whole course of the disease. In some, there was a want of *appetite*. In others, it was perfectly natural. Some complained of a soreness in their mouths, as if they had been inflamed by holding pepper in them. Some had *swelled-jaws*, and many complained of the *tooth-ach*. I saw only one case in which the disease produced a *coma*.

Many were affected with pains in the *breast* and *sides*. A difficulty of breathing attended in some, and a *cough* was universal. Sometimes this cough alternated with a pain in the *head*. Sometimes it preceded this pain, and sometimes it followed it. It was at all times distressing. In some instances it resembled the chin-cough. One person expired in a fit of coughing, and many persons spat blood in consequence of its violence. I saw several patients in whom the disease affected the trachea chiefly, producing great difficulty of breathing, and, in one case, a suppression of the voice, and I heard of another in which the disease, by falling on the trachea, produced a cyanche trachealis. In most of the cases which terminated fatally, the patients died of pneumonia notha.

The *stomach* was sometimes affected by nausea and vomiting; but this was far from being a universal symptom.

I met with four cases in which the whole force of the

disease fell upon the *bowels*, and went off in a diarrhœa ; but in general the bowels were regular or costive.

The *limbs* were affected with such acute pains as to be mistaken for the rheumatism, or for the break-bone fever of 1780. The pains were most acute in the back and thighs.

Profuse sweats appeared in many over the whole body in the beginning, but without affording any relief. It was in some instances accompanied by erysipelatous, and in four cases which came to my knowledge, it was followed by miliary eruptions.

The *pulse* was sometimes tense and quick, but seldom full. In a great majority of those whom I visited it was quick, weak, and soft.

There was no appearance in the urine different from what is common in all fevers.

The disease had evident remissions, and the fever seldom continued above three or four days ; but the cough, and some other troublesome symptoms, sometimes continued two or three weeks.

In a few persons, the fever terminated in a tedious and dangerous typhus.

In several pregnant women it produced uterine hemorrhages and abortions.

It affected adults of both sexes alike. A few old people escaped it. It passed by children under eight years old with a few exceptions. Out of five and thirty maniacs in the Pennsylvania hospital, but three were affected by it. No profession or occupation escaped it. The smell of tar and tobacco did not preserve the persons who worked in them from the disease, nor did the use of tobacco, in snuff, smoking or chewing, afford a security against it.*

Even previous and existing diseases did not protect patients from it. It insinuated into sick chambers, and blended itself with every species of chronic complaint.

It was remarkable that persons who worked in the open air, such as sailors, and 'long-shore-men, (to use a

* Mr. Howard informs us that the use of tobacco is not a preservative against the plague, as has formerly been supposed ; of course that apology for use of an offensive weed should not be admitted.

mercantile epithet) had it much worse than tradesmen who worked within doors. A body of surveyors, in the eastern woods of Pennsylvania, suffered extremely from it. Even the vigour of constitution which is imparted by the savage life did not mitigate its violence. Mr. Andrew Ellicott, the geographer of the United States, informed me that he was a witness of its affecting the Indians in the neighbourhood of Niagara with peculiar force. The cough which attended this disease was so new and so irritating a complaint among them, that they ascribed it to witchcraft.

It proved most fatal on the sea-shore of the United States.

Many people who had recovered, were affected a second time with all the symptoms of the disease. I met with a woman, who after recovering from it in Philadelphia, took it a second time in New York, and a third time upon her return to Philadelphia.

Many thousand people had the disease, who were not confined to their houses, but transacted business as usual out of doors. A perpetual coughing was heard in every street of the city. Buying and selling were rendered tedious by the coughing of the farmer and the citizen who met in market places. It even rendered divine service scarcely intelligible in the churches.

A few persons who were exposed to the disease escaped it, and some had it so lightly as scarcely to be sensible of it. Of the persons who were confined to their houses, not a fourth part of them kept their beds.

It proved fatal (with few exceptions) only to old people, and to persons who had been previously debilitated by consumptive complaints. It likewise carried off several hard drinkers. It terminated in asthma in three persons whose cases came under my notice, and in pulmonary consumption, in many more. I met with an instance in a lady, who was much relieved of a chronic complaint in her liver; and I heard of another instance of a clergyman whose general health was much improved by a severe attack of this disease.

It was not wholly confined to the human species. It affected two cats, two house dogs, and one horse, within the sphere of my observations. One of the dogs dis-

turbed his mistress so much by coughing at night, that she gave him ten drops of laudanum for several nights, which perfectly composed him. One of the cats had a vomiting with her cough. The horse breathed as if he had been affected by the cynanche trachealis.

The scarlatina anginosa, which prevailed during the summer, disappeared after the first of October; but appeared again after the influenza left the city. Nor was the remitting fever seen during the prevalence of the reigning epidemic.

I inoculated about twenty children for the small-pox during this prevalence of the influenza, and never saw that disease exhibit a more favourable appearance.

In the treatment of the influenza I was governed by the state of the system. Where inflammatory diathesis discovered itself by a full or tense pulse, or where great difficulty of breathing occurred, and the pulse was low and weak in the beginning of the disease, I ordered moderate bleeding. In a few cases in which the symptoms of pneumony attended, I bled a second time with advantage. In all these instances of inflammatory affection, I gave the usual antiphlogistic medicines. I found that vomits did not terminate the disease, as they often do a common catarrh, in the course of a day, or of a few hours.

In cases where no inflammatory action appeared in the system, I prescribed cordial drinks and diet, and forbade every kind of evacuation. I saw several instances of persons who had languished for a week or two with the disease who were suddenly cured by eating a hearty meal, or by drinking half a pint of wine, or a pint of warm punch. In all these cases of weak action in the blood-vessels, liquid laudanum gave great relief, not only by suspending the cough, but by easing the pains in the bones.

I met with a case of an old lady who was suddenly and perfectly cured of her cough by a fright.

The duration of this epidemic in our city was about six weeks. It spread from New York and Philadelphia in all directions, and in the course of a few months pervaded every state in the union. It was carried from

the United States to several of the West India islands. It prevailed in the island of Grenada in the month of November, 1789, and it was heard of in the course of the ensuing winter in the Spanish settlements in South America.

The following winter was unusually mild, insomuch that the navigation of the Delaware was not interrupted during the whole season, only from the seventh to the twenty-fourth of February. The weather on the third and fourth days of March was very cold, and on the eighth and ninth days of the same month, the mercury in Fahrenheit's thermometer stood at 4° at seven o'clock in the morning. On the tenth and eleventh, there fell a deep snow. The weather during the remaining part of the month was cold, rainy, and variable. It continued to be variable during the month of April. About the middle of the month there fell an unusual quantity of rain. The showers which fell on the night of the seventeenth will long be connected in the memories of the citizens of Philadelphia, with the time of the death of the celebrated Dr. Franklin. Several pleurisies appeared during this month; also a few cases of measles. In the last week of the month the influenza made its appearance. It was brought to the city from New England, and affected, in its course, all the intermediate states. Its symptoms were nearly the same as they were in the preceding autumn, but in many people it put on some new appearances. Several persons who were affected by it had symptoms of madness, one of whom destroyed himself by jumping out of a window. Some had no cough, but very acute pains in the back and head. It was remarked that those who had the disease chiefly in the breast the last year, complained now chiefly of their heads, while those whose heads were affected formerly, now complained chiefly of their breasts. In many it put on the type of an intermitting fever. Several complained of constant chills, or constant sweats; and some were much alarmed by an uncommon blue and dark colour in their hands. I saw one case of ischuria, another of an acute pain in the rectum, a third of anasarca, and a fourth of a palsy

in the tongue and arms; all of which appeared to be anomalous symptoms of the influenza. Sneezing, and pains in the ears and frontal sinus, were less common now than they were in the fall; but a pain in the eye-balls was a universal symptom. Some had a pain in the one eye only, and a few had sore eyes, and swellings in the face. Many women who had it, were affected by an irregular appearance of the catamenia. In two persons whom I saw, the cough was incessant for three days, nor could it be composed by any other remedy than plentiful bleeding. A patient of Dr. Samuel Duffield informed me, after his recovery, that he had had no other symptom of the disease than an efflorescence on his skin, and a large swelling in his groin, which terminated in a tedious abscess.

The prisoners in the jail who had it in the autumn, escaped it this spring.

During the prevalence of this disease, I saw no sign of any other epidemic.

It declined sensibly about the first week in June, and after the twelfth day of this month I was not called to a single patient in it.

The remedies for it were the same as were used in the fall.

I used bleeding in several cases on the second, third, and fourth days of the disease, where it had appeared to be improper in its first stage. The cases which required bleeding were far from being general. I saw two instances of syncope of an alarming nature, after the loss of ten ounces of blood; and I heard of one instance of a boy who died in half an hour after this evacuation.

I remarked that purges of all kinds worked more violently than usual in this disease.

The convalescence from it was very slow, and a general languor appeared to pervade the citizens for several weeks after it left the city.

The month of December, 1790, was extremely and uniformly cold. In the beginning of the month of January, 1791, the weather moderated, and continued to be pleasant till the seventeenth, on which day the navigation of

the Delaware, which had been completely obstructed by the ice, was opened so as to admit of the arrival of several vessels. During the month of December many people complained of *colds*; but they were ascribed wholly to the weather. In January four or five persons in a family were affected by colds at the same time; which created a suspicion of a return of the influenza. This suspicion was soon confirmed by accounts of its prevailing in the neighbouring counties of Chester and Montgomery, in Pennsylvania, and in the distant states of Virginia, and Rhode Island. It did not affect near so generally as in the two former times of appearance. There was no difference in the method of treating it. While the common inflammatory diseases of the winter bore the lancet as usual, it was remarked that patients who were attacked by the influenza, did not bear bleeding in a greater proportion, or in a larger quantity, than in the two former times of its appearance in the city.

I shall conclude this account of the influenza by the following observations:

1. It exists independently of the sensible qualities of the air, and in all kinds of weather. Dr. Patrick Russel has proved the plague to be equally independent of the influence of the sensible qualities of the atmosphere, to a certain degree.

2. The influenza passes with the greatest rapidity through a country, and affects the greatest number of people, in a given time, of any disease in the world.

3. It appears from the histories of it which are upon record, that neither climate, nor the different states of society, have produced any *material* change in the disease. This will appear from comparing the account I have given, with the histories of it which have lately been given by Dr. Grey, Dr. Hamilton, Dr. A. Fothergill, Mr. Chisholm, and other modern physicians. It appears further, that even time itself has not been able materially to change the type of this disease. This is evident, from comparing modern accounts of it with those which have been handed down to us by ancient physicians.

I have hinted in a former essay at the *diminutives* of certain diseases. There is a state of influenza, which is less violent and more local, than that which has been described. It generally prevails in the winter season. It seems to originate from a morbid matter, generated in crowded and heated churches; and other assemblies of the people. I have seen a cold, or influenza, frequently universal in Philadelphia, which I have distinctly traced to this source. It would seem as if the same species of diseases resembled pictures, and that while some of them partook of the deep and vivid nature of mosaic work, others appeared like the feeble and transient impressions of water colours.

END OF THE SECOND VOLUME.

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Medical Inquiries and Observations, v. 1-2, Fifth Edition
Rush, Benjamin
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National Library of Medicine
Bethesda, MD

CONDITION ON RECEIPT:

The tight back leather binding was worn and deteriorated. The leather was powdery, darkened, and cracked; it was flaking and some was missing. The leather on the spine was especially deteriorated. The front board was detached. The back joint and internal hinge were broken. The sewing was extremely weak. Most of the pages were relatively flexible even though they were discolored and slightly acidic. Some pages had a few small tears. A few leaves protruded beyond the text block.

TREATMENT PERFORMED:

The pH was recorded before and after treatment: before 5.5, after 8.5. The volume was collated and disbound. The inks were tested for solubility. The head, tail, and pages were dry cleaned where necessary; the pages were washed and then buffered (deacidified) with magnesium bicarbonate solution. Tears were mended and folds guarded where necessary with Japanese kozo paper and wheat starch paste. The volume was sewn on linen tapes with linen thread. Handmade paper endsheets with linen hinges were attached. The volume was case bound in full cloth and titled using a gold stamped leather label.

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